AMERICAN ARTISAN

• This 2,000,000 Btu capacity gas fired unit heats a three-story building and maintains temperature at two different levels. Page 42.

• Aluminum sheets have become increasingly popular for architectural uses. Page 36.

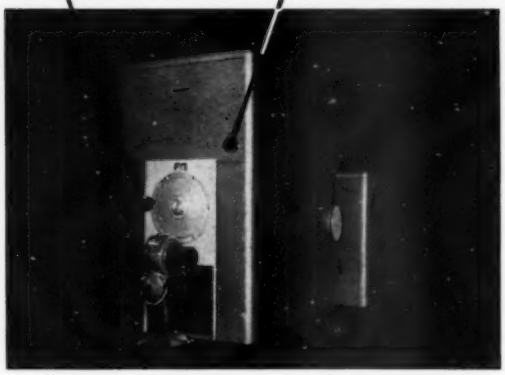
• Well-designed printed forms simplify business operations and save time and money. Page 39.

• Perimeter warm air heating can also be applied to houses with basements. Page 46.

• Sheet metal workers in poor health face danger when working at dizzy heights. Page 49.

industrial heating

industrial ventilation



J-C Powerated* Furnaces provide large-scale heating or tempered industrial air ventilation . . . in a single installation.

The right J-C designed heating and ventilating system "pays off" in increased industrial efficiency. Why not let our Engineer covering your territory assist with your heating or ventilating plans, or contact us here at Saginaw.

Jackson & Church contractors are ready now to supply the needs of expanding industry with job-specified Powerated* warm air heating or ventilating systems. Powerated* models are available and are being shipped in good quantity, in a range of sizes from 380,000 Btu to 3,800,000 Btu output per hour to meet all heavy-duty requirements.

**Powerated furnaces are designed to meet specific Btu requirements.*

. . . America's Largest and Most Complete Warm Air Heating Line . . .

J-C

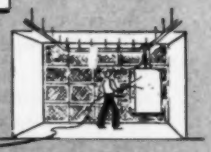
JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN

WORK WELL DONE SINCE '81

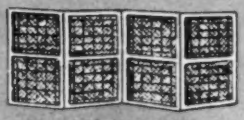
THERE'S AN RP *Air Filter for:*

FORCED WARM AIR FURNACES

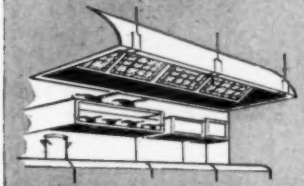
UNIT AIR CONDITIONERS



PAINT SPRAY BOOTH



CENTRAL SYSTEM FILTER BANKS



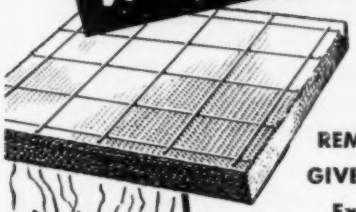
KITCHEN GREASE CANOPIES

ENGINE INTAKE

SPECIAL PURPOSE DESIGNS

Tell us your Air Filter needs and specifications

you can't tell "*What's Cooking*" . . . without LOOKING



NEW RP DUST *and* ODOR REMOVING AIR FILTERS GIVE YOUR CUSTOMERS Extra SERVICE . . .

GIVE *you* Extra Sales and PROFITS

Now, you can offer your customers another forced warm air extra . . . R-P D.O. Air Filters with a combination of high dust removal efficiency **and automatic** odor removal.

The D.O. Air Filter fills the requirement for your customers who prefer replaceable type filters. Those who prefer R-P E Z Kleen Washable Filters will buy R-P D.O. Kote, the dust and odor removing adhesive for home application.

This sensational innovation in the panel air filter field means increased volume for you — in filter sales . . . an impetus to forced warm air heating sales . . . and added income from a new re-sale item — D.O. Kote.

Dealer helps including window streamers, folders, newspaper ad mats, television spots, radio commercials and displays are available. Write for complete information.

Write **RESEARCH PRODUCTS CORP., Madison, Wis., U. S. A.**

RP . . . PRODUCTS OF RESEARCH

WASHABLE AND REPLACEMENT AIR FILTERS • GREASE FILTERS
EVAPORATIVE COOLER MATERIALS

AMERICAN ARTISAN

RESIDENTIAL
AIR CONDITIONING
WARM AIR HEATING
SHEET METAL CONTRACTING

Member—Audit Bureau of Circulations
Member—Associated Business Publications

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Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

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Founded 1864

OCTOBER 1951

Volume 88, No. 10

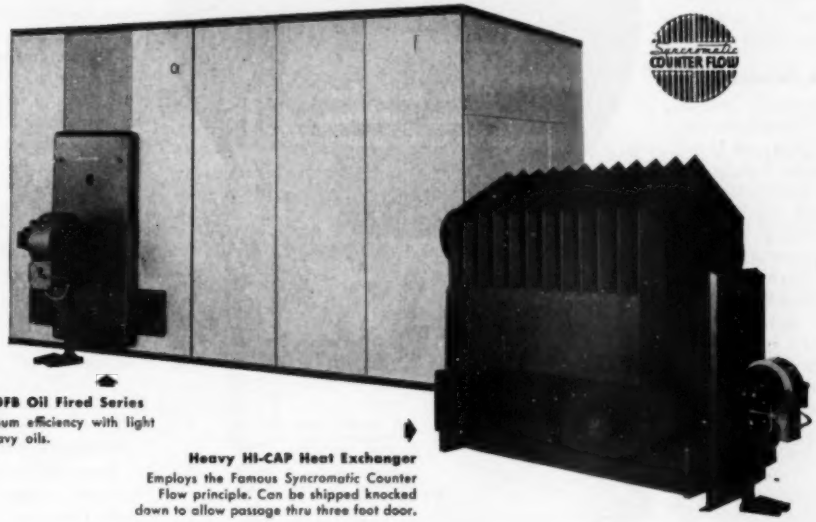
Syncromatic

HIGH EFFICIENCY HI-CAP STEEL FURNACES

HIGH CAPACITY

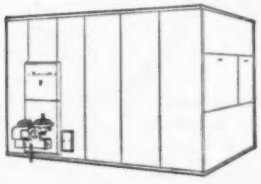
10 SIZES FROM 330,000 TO 1,000,000 B.T.U.

THE PRACTICAL HEATING UNIT FOR
SCHOOLS, CHURCHES, GARAGES, STORES, WAREHOUSES, FACTORIES
AND PUBLIC AND COMMERCIAL BUILDINGS OF ALL KINDS

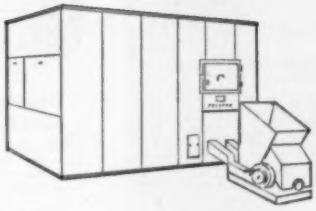


The OFB Oil Fired Series
Maximum efficiency with light or heavy oils.

Heavy HI-CAP Heat Exchanger
Employs the Famous *Syncromatic* Counter Flow principle. Can be shipped knocked down to allow passage thru three foot door.



GFB
Gas Fired
Series



CFB
Coal Fired Series
Stoker or Hand Fired

For complete specifications and information on special applications write or call . . .

Syncromatic Corporation
WATERTOWN, WISCONSIN

1931 20th YEAR 1951

the editor's notebook

Effective Price Control

It begins to look as if the American housewife is a better price controller than the government. The government recently granted a shirt manufacturer authority to raise prices. The manufacturer looked over the market and decided to leave prices where they were. Other manufacturers found it advisable to follow the same policy.

NWAH&ACA Manuals

Readers frequently ask us for sources of information and data on the design and installation of warm air heating systems and we always suggest the manuals of the National Warm Air Heating and Air Conditioning Association as a basic source. Every warm air heating contractor should have a full set of these manuals. They are concise, written in an easily understood manner, and contain a total of 240 pages of practical guidance. They were written by warm air heating men for warm air heating men.

Special worksheets have also been published by the association for use in conjunction with the manuals. Thousands of heating dealers throughout the country have found the manuals and worksheets one of their best sources for correct design and installation data.

While it may contribute to their stature to say these manuals have been accepted as authoritative guides by federal, state, and many local building officials, it seems the wholehearted acceptance by the industry itself attests their real practical value.

We are not listing the manuals here, but the illustration will serve to indicate the array of manuals and material available from the association. There are 10 manuals which may be purchased at 60 cents each. Or, they may be purchased in one loose leaf volume at $8 along with sample worksheets, promotional material, and numerous articles on various warm air heating applications.

Send orders direct to the association at 145 Public Square, Cleveland 14, Ohio.

Sentry
AT-A-GLANCE
REMOTE and DIRECT READING
TANK GAUGES

FOR BASEMENT TANKS: Type D-O for 2" openings, Type D-10 for 1½" openings.
For accurate, easy reading of tanks — indoors, outside or underground.
AT-A-GLANCE
OIL GAUGE
7/8 5/8 3/8 1/8
F 3/4 1/2 1/4 E
KRUEGER SENTRY GAUGE CO.
FOR UNDERGROUND TANKS: Type D-U, shown at right, for 2" openings only.
Left: Standard type At-A-Glance Gauge for direct reading at storage tank. Also available with special fitting for use and adaptation with remote gauge indicators to permit dual readings — both at tank and outside.

Dependable, Inexpensive, Weatherproof... Simple Mechanical GAUGES, Easy to Install

Accurately indicates liquid level in remote storage tanks at all times — Not affected by specific gravity oil changes or variations. Simplified mechanical operation eliminates unnecessary fittings, bulbs or levers for oil men to tamper with — no need for access to building. Can be installed for dual location readings — indoors and out. Non-corrosive stainless steel and brass extension lines connect tank float with cast aluminum, weatherproof, thermometer type indicator — calibrated in fractions. Easy to read, unconditionally guaranteed. Write for folder showing complete line.

KRUEGER Sentry GAUGES
GREEN BAY • WISCONSIN

How Many Cows Does It Take to Heat a House?

How many cows does it take to heat a house? Eighteen bossies keep one farmer's family cozy all winter — from a distance — at a state-sponsored model farm near the village of Lund, in southern Sweden.

The cows give milk, too.

They don't know it, but while they relax, their body heat is collected.

It is piped 40 yards to the farmhouse where it keeps five rooms nice and warm.

Engineer Marten Blomquist started the experiment two and one-half years ago for a Swedish state research committee for farmyard workers.

He said it works fine.

Blomquist found that one cow produces between 17 and

FOR THE BIGGEST "DIVIDENDS" YOU'VE EVER RECEIVED FROM ANY SHOP EQUIPMENT . . .

. . . get a LOCKFORMER!

Lockformers make Pittsburghs and other seams fifteen times as fast as hand methods; cut overall duct fabrication cost in half.

FOR THE "MOST FOR YOUR MONEY" IN ANY SHOP EQUIPMENT . . .

. . . get a LOCKFORMER!

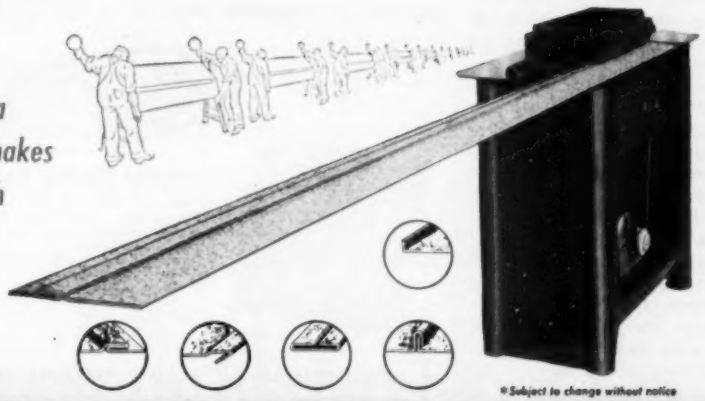
You can still buy a genuine Lockformer, complete and ready to operate, for as little as $245.*

FOR LONGEST LIFE AND TROUBLE-FREE PERFORMANCE . . .

. . . get a LOCKFORMER!

Lockformers are seemingly "wear-out-proof". One owner reports running more than 4,000,000 feet of Pittsburgh Locks with no repair expense whatever.

One Man with a LOCKFORMER makes more Pittsburgh Locks than Sixteen Men with Eight Brakes



*Subject to change without notice

THE LOCKFORMER CO.

4615 WEST ROOSEVELT ROAD • CHICAGO 50, ILLINOIS

the editor's notebook

20 pounds of steam and about 80,000 Btu every 24 hours.

A bunch of cows doesn't need all that heat to keep their barn comfortable, Blomquist reasoned.

So he installed a combination air conditioning and heat pump device in the cow barn to borrow some Btu's for the farmhouse.

The engineer figures he saves about 50 per cent of the excess heat formerly wasted on cattle.

The temperatures in the barn and house, he said, can be maintained at a constant level by thermostatic control.—the hot stove Reporter.

Nefarious Sales Practices

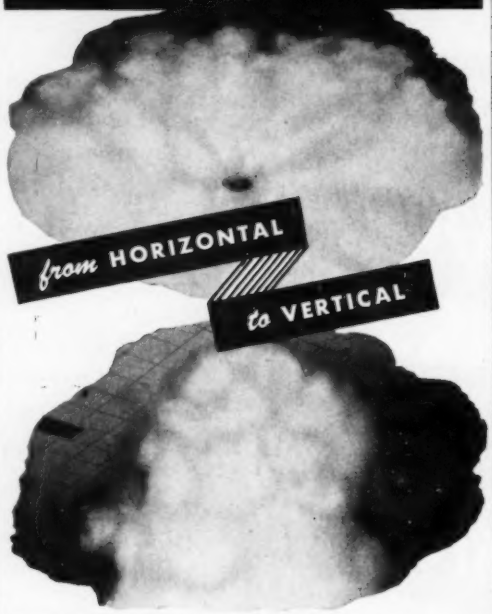
Since October 9, 1950, when the Missouri Public Service Commission issued an order permitting, with certain exceptions, the Laclede Gas Co. to discontinue accepting any new customers for house heating for the then current heating season, nearly all local heating contractors respected the order and ceased selling gas furnaces and conversion burners immediately. A few ignored the mandate and continued to take orders, accepted cash deposits and, in some instances, delivered the equipment to the customer's home with the statement that it would be connected when gas "is" released. A goodly number of cases also were reported to the bureau office by purchasers because the heating contractor actually connected the furnace or conversion burner to the gas line with a statement to the customer, "Now that the equipment is in the gas company has got to serve you."

The result of this nefarious practice caused the purchasers

BARBER COLMAN

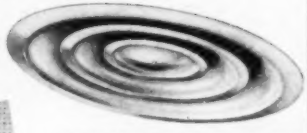
CEILING OUTLETS *feature*

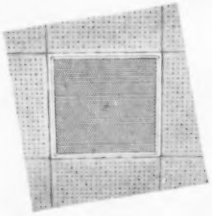
ADJUSTABLE AIR PATTERNS



MODEL "J" CEILING OUTLET

Circular type, surface or flush mounting, supply or exhaust or both. Integral volume control. Write for Bulletin F-4085-1.





SQUARE CEILING OUTLET

Made to fit and blend into acoustical tile ceilings. Key-operated control provides air pattern adjustment. Write for Bulletin F-4728.

★ LOW NOISE LEVEL ★ LOW PRESSURE DROP
★ ENGINEERED FOR COMFORT CONDITIONING

NATION-WIDE SALES AND ENGINEERING SERVICE

BARBER-COLMAN COMPANY
1226 ROCK ST., ROCKFORD, ILLINOIS

the editor's notebook

inconvenience, worry and in some cases financial hardship, because those who had permitted the equipment to be connected are compelled to pay on a general gas service rate which is much higher than the general space heating rate applicable if their equipment had been installed on an approved basis.

The bureau was successful in most instances where contracts have been executed and a down payment secured, in prevailing upon the contractor to cancel the order and make refund of the monies paid. In some cases where the contractor had gone so far as to actually deliver the equipment the bureau was successful in having the heater picked up and returned to stock, the contract cancelled any money paid being refunded to the purchaser.

Those cases where equipment has actually been installed and connected without the knowledge or consent of the Laclede Gas Co., poses a serious problem for the purchasers. The company may, according to the "order," discontinue the service entirely. The company from whom the purchase was made may be financially irresponsible or the principals may have "left town between suns," which means that the buyer is "holding the bag." – from the St. Louis Better Business Bureau Bulletin.

New Housing Characteristics

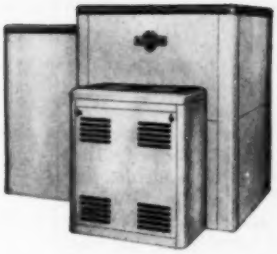
A nationwide survey of housing characteristics made during the first half of 1950 indicates several major trends in new single family house construction in the last decade. Since the survey was made early in 1950, the results were not in-

QUALITY OF PRODUCT

Waterbury

The WATERMAN WATERBURY Co. MINNEAPOLIS

A product is best judged by its quality... manufacturer, distributor, dealer and consumer all know that quality above all sells and satisfies.



We of The Waterman-Waterbury Company are proud of our warm air heating products. Our distributors and dealers are equally proud of their work in connection with our products. They know that satisfied Waterbury customers are their best salesmen... because Waterbury means "Quality of Product."

"It's what's under the casing that counts!"

The Waterman-Waterbury Co.

OVER 44 YEARS OF WARM AIR HEATING

1122 JACKSON STREET N. E. • MINNEAPOLIS 13, MINNESOTA

fluenced by the present emergency.

A total of 31 per cent of the houses were equipped with winter air conditioning units in 1950 compared with 19 per cent in 1940.

Gravity warm air heating decreased to 18 per cent last year, from 23 per cent.

Floor furnaces remained constant at 22 per cent.

Houses equipped with gutters and downspouts decreased 5 per cent, to 68 per cent.

Another item of interest to heating and sheet metal men is the fireplace. Unless the trend changes, burning logs on a cold winter evening may become a thing of the past. This tradition of home life dropped to 22 per cent in 1950. In 1940 62 per cent of the new houses were equipped with fireplaces.

Handling Customer Complaints

With the approach of another heating season, many enterprising contractors will turn their attention to their service program and facilities for the winter months. Automatic heating equipment, consisting of automatic fired units and conversion burners, is now being installed at a rate of more than a million annually. Servicing these units has become a major function of the modern heating organization and the public looks to local dealers to provide it.

A service call is initiated by a call from a customer, or from any user of automatic heating equipment. Many persons like to place any call for assistance into the category of a complaint when actually, it is genuine evidence of need for help and often offers an opportunity

Sun FUEL MASTER

SALES are CLIMBING

Because *SUN* Furnaces *Deliver* Satisfaction

Ask any SUN dealer if he's making money on the SUN line. He'll tell you that SUN is the hottest line of furnaces he's ever sold . . that with 22 sizes and types he can fit the budget of any prospect whether it's a small home owner with 4½ rooms or the operator of a large installation.

He'll open up a SUN furnace and point out the many features of SUN construction which give them years of service-free operation . . he'll **show** you why SUN furnaces are so outstandingly efficient of fuel and generous of heat.

Press him further and he'll name names of customers all of whom bought SUN because friends or neighbors told them of the advantages of SUN heating.

Then, if you haven't heard enough, write or phone for the new SUN catalog and see **for yourself** why SUN furnaces are the best buy in heating.

J. V. Patten Company
SYCAMORE, ILLINOIS, U.S.A.

the editor's notebook

to create business and make a friend as well.

Here is what the Canadian Chapter of the National Warm Air Heating and Air Conditioning Association says about handling these calls:

You'll find that there is general agreement among professional complaint handlers regarding several basic principles that are important in getting complaints adjusted to the actual satisfaction of the customer and dealer.

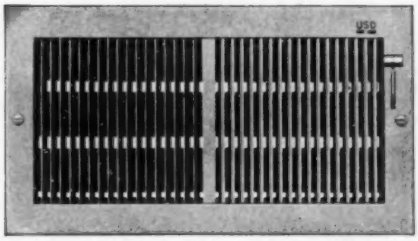
First, about 97 per cent of all complaints have *some* justification from the customer's point of view. This seems to tie in with the observation of organizations who take public opinion polls; namely, that about 3 per cent of the general public is made up of individuals who are screwballs.

Second, most people are excited or emotionally upset when they register a complaint. It perhaps started as some trifling annoyance and the more they thought about the complaint the bigger it seemed to be. In many cases the customer even goes so far as to actually consider what he will tell the dealer and what the dealer is going to reply.

Third, many people fully believe that when they do state their complaint, the dealer will do one of two things. Either he will deny flatly that there is any ground for the complaint or he will belittle it. Neither of these expected reactions makes the customer any happier.

Because of these three basic conditions, professional handlers of complaints agree that the first ten words that the dealer speaks in response to the complaint, will have more effect than the next ten thou-

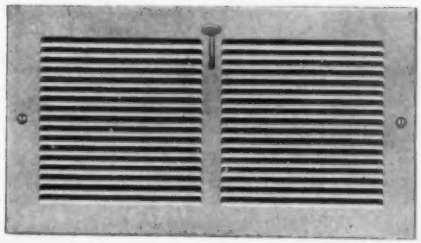
Auer Registers



● **Always dependable in quality, Auer also has the advantage of a complete line for all your register and grille needs.**

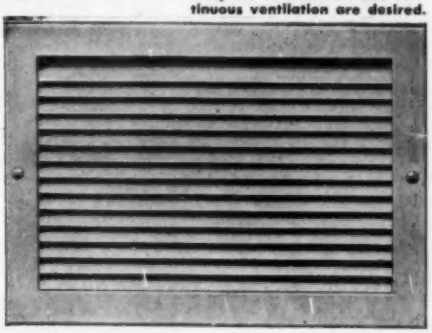
Send for Auer Register Book showing all models for gravity and air conditioning — or Catalog "G" on perforated grilles.

No. 4432 Airo-Flex Register, flexible fins and multi-louver valve. Also furnished with single valve (No. 4032).



No. 7032 Airo-Flex single valve Register, adjustable fins.

V-type louver with stationary blades, for openings where complete concealment and continuous ventilation are desired.



No. 2000W Slide Frame for Wall. Auer adjustable stud frames save time and money on installation. Make a better job, without framing or blocking in around opening. Frame is secured to stud with 4 nails. Furnished for most Auer air conditioning registers. Specify whether for wall or base.

THE AUER REGISTER CO., 6600 CLEMENT AVE., CLEVELAND 5, OHIO

Canadian Distributor, Marchand Furnace, Ltd., Tilbury, Ont.

the editor's notebook

sand words in promoting a satisfactory adjustment.

The question then becomes: What shall the dealer say in the first ten words? The professionals agree also on this point . . . that the dealer should find *something*, and find it immediately, on which he can agree with the customer. That doesn't necessarily mean that the dealer will spinelessly agree completely that the customer is absolutely right. But it does mean that he should find *some* point on which he *can* honestly and sincerely agree *because that is the last thing that the customer expects.* The result is that the customer's attitude changes completely. He fully expected disagreement. Instead, the dealer agreed or seemed to agree with him.

If Mrs. Green calls up and complains that her daughter's room is not heating properly and that the rest of the house isn't too comfortable either, it doesn't mean that the dealer needs to say, "I think you're absolutely right, Mrs. Green. I know that it was a very poor heating system we installed for you." That would be utter nonsense. But at least he *can* say, "It does sound as if there's something wrong there, doesn't it? We'd better find out what it is and get it adjusted for you, Mrs. Green. We'll be glad to see about it promptly."

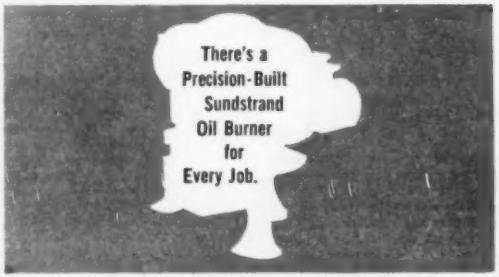
And when he tells her that he will see about it *promptly*, he should do exactly that! The longer a complaint drags, the harder it is to adjust it. Many complaints start with some trivial matter which can be easily corrected. But if it's not taken care of at once, the customer will find more things

The Sundstrand
All Electric
OIL BURNER

ATTRACTIVE
DURABLE
ECONOMICAL
DEPENDABLE
EXTREMELY QUIET
LOW PRICED

A cautious Buyer is a Sundstrand Customer

OHI



For Full Information, write . . .
SUNDSTRAND ENGINEERING CO.
Rockford, Illinois . . . . U.S.A.

the editor's notebook

that he imagines are wrong. Hence, the urgent necessity of being really *prompt*.

In addition to promptness, it is highly desirable from the standpoint of building good will, to make the adjustment *completely*. Too many dealers in making an adjustment seem to try to see how little they can do to satisfy the customer.

Finally, all professionals agree that, again for the sake of building up valuable good will, all adjustments should be made courteously.

Who was the First Motor Vehicle Fatality?

As far as the National Safety Council can discover, the first fatal motor vehicle accident on record occurred in New York City in September, 1899. H. H. Bliss stepped off a trolley car and turned around to assist a woman who was also getting off. A passing automobile struck him. It stopped and a passenger, who was a doctor, rendered first aid. However, the following day, Mr. Bliss died in the Roosevelt Hospital.

In 1906, Edward Shanart was killed by an auto as he hopped off a trolley car in Rochester.

Later that same year in Rochester, a nine year old boy, Harry Wilcox, was struck and fatally injured by an automobile.

The National Safety Council would welcome information concerning the first motor vehicle traffic death in each state and each large city. Please send such information to Paul Jones, Director of Public Information, National Safety Council, 425 N. Michigan Blvd. Chicago 11, Ill.

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THIS AD WILL REACH OVER
8,500,000 READERS ↓

THIS BOOKLET OFFERED
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"The lady who loved a thermostat"

. . . probably the most romantic story ever written about a thermostat! Send for free copy! Behind the heart-throbs . . . you'll find surprising facts about how to keep your home *comfortably heated* . . . with a modern thermostat . . . no matter what kind of heating system you have. Facts important to the health and happiness of every home owner! Fun to read, too!

PERFEX
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Guaranteed by Good Housekeeping

Magic Dial
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"Your copy is FREE, Folks!"

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GOOD HOUSEKEEPING

BUILDING MANUAL

Most of your customers recognize the Good Housekeeping Guarantee Seal

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Mueller Climatrol
Announces
2 more new money-makers for you

...with designed convertibility

These outstanding features build extra sales for you!

- **Compact, space saving** — only 51" high, 29¼" deep. The Type 211 is 25½" wide; the Type 212 is 44⅝" wide.
- **90,000 — 110,000 Btu input** — (Type 211 available as 90,000 Btu input only). Available with either of two efficient pressure atomizing oil burners.
- **Designed convertibility** — replacing oil burner with Mueller's efficient gas burner, is simple, quick and inexpensive.
- **Competitively priced** — and Mueller's quality makes each a better value buy.
- **All-welded heat exchanger** — of heavy gauge steel. Square, wrap around radiator.
- **Handsome steel casing** — lined with sound absorbing, heat reflecting asbestos which is laminated with aluminum foil.
- **Easy servicing** — completely cleanable through removable access panels.
- **Low cost installation** — both units shipped assembled on solid steel base; will go through most any door.

...with outstanding design features that make them strong business builders in your low-cost housing market

Here's good news for you — and for your low-cost housing customers! Two new oil-fired Mueller Climatrol units tailor-made to fit their needs exactly; both quickly and inexpensively converted to gas.

The Types 211 and 212 are designed and priced to meet the building specifications and buying limitations of your small home prospects. But they are also built to the high quality standards that have made Mueller Climatrol the pacemaker of the industry when it comes to heating value. The features listed at the left are a few of the highlights of these new Mueller units.

You certainly don't have to look far to find prospects for such a combination of design and value advantages today. Once more you're way ahead with a Mueller Climatrol built to bring you immediate sales and profits. Start now with a stock order . . . *L. J. Mueller Furnace Co., 2030L W. Oklahoma Ave., Milwaukee 15, Wisconsin*

94th Anniversary

—Mueller Climatrol

FOR GAS FOR OIL FOR COAL

D-123

Using **Copper** wisely in **Building Design** and **Construction**

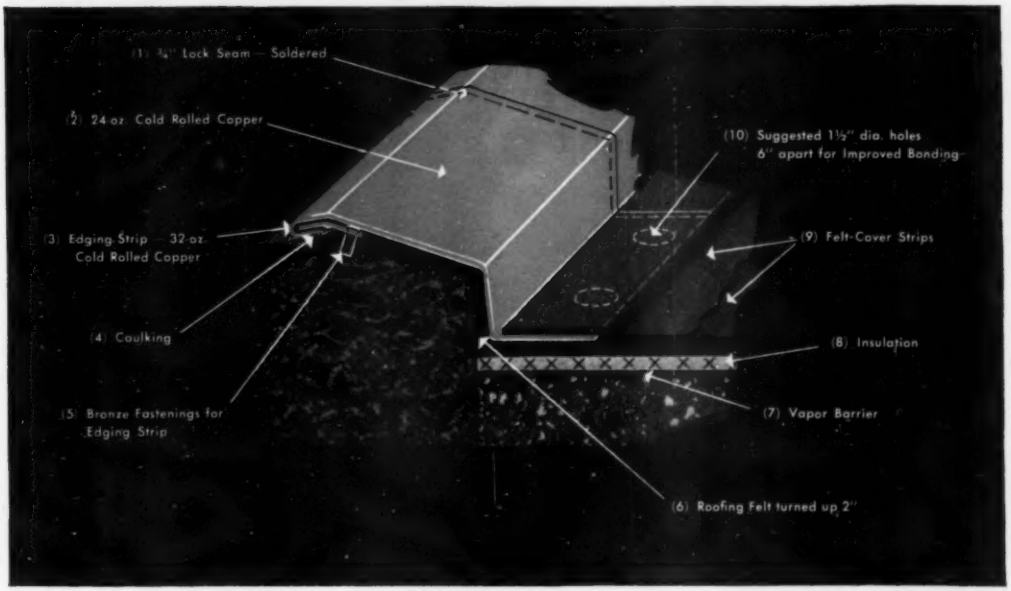
WRITE FOR DETAIL DRAWINGS
Numbered for A.I.A. Filing

Details of the copper construction illustrated in this sketch are available on 8½"x 11" sheets convenient for filing. Other sketches, showing how a little copper can go a long way in achieving good building construction, will be featured in subsequent advertisements.

Copper flashing at roof— no parapet

Where walls are to have a capping stone in place of a parapet, this flashing construction is suggested. Twenty-four oz. cold rolled copper with locked soldered seams is recommended so that ample strength will be provided for expansion and contraction stresses. Copper used properly for this and other building details affords lasting protection and a minimum of maintenance expense. For suggestions or counsel on any problem involving sheet copper construction write: The American Brass Company, Waterbury 20, Connecticut. 5136

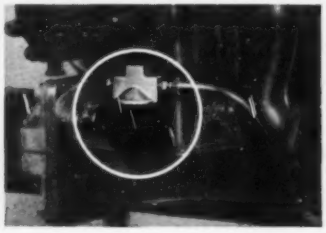
In Canada: *Anaconda American Brass Ltd., New Toronto, Ontario.*

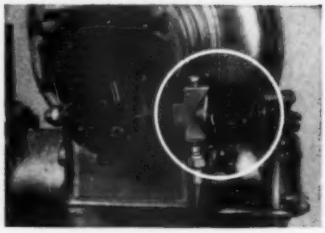

(1) ¾" Lock Seam — Soldered
(2) 24 oz. Cold Rolled Copper
(3) Edging Strip — 32 oz. Cold Rolled Copper
(4) Caulking
(5) Bronze Fastenings for Edging Strip
(10) Suggested 1½" dia. holes 6' apart for Improved Bonding
(9) Felt-Cover Strips
(8) Insulation
(7) Vapor Barrier
(6) Roofing Felt turned up 2"

nothing lasts like **ANACONDA®**
COPPER

New Honeywell Delayed-Opening assures a cleaner start—

Easy to install! Mounts in any position!





Oil Valve
a clean stop every time!

Insures improved performance in high-pressure oil burners!

Here's the answer to one of your oldest, biggest problems. This new V4001 Oil Valve helps prevent lazy and smoky starts and stops in high pressure oil burners. This means:

- Reduction of carbon coating on burner nozzle and electrodes.
- Reduction of excessive soot deposits in the heat exchanger.
- Reduction of start-stop oil odors.
- Vastly improved efficiency and performance.
- More satisfied customers.

Here's how it works. This valve permits delivery of oil only after the burner motor and the ignition have been operating for several seconds. This means combustion takes place only after the normal fuel-air ratio has been established. Valve closes instantly on burner shut down. Clean starts . . . clean stops are assured every time!

Can be installed in any position. Pictures at left show that the Honeywell Delayed Opening Oil Valve can be installed in whatever position is most convenient...because of positive snap action provided by spring loaded plunger. For more reasons why you should standardize on this valve, call your local Honeywell Office. Or write Honeywell, Dept. AA-10-188, Minneapolis 8, Minnesota, today!

"This wonderful valve is bringing me new business!"

I started selling the Honeywell Delayed Opening Oil Valve to my customers as soon as it came on the market. You'd be amazed at the difference it's made!

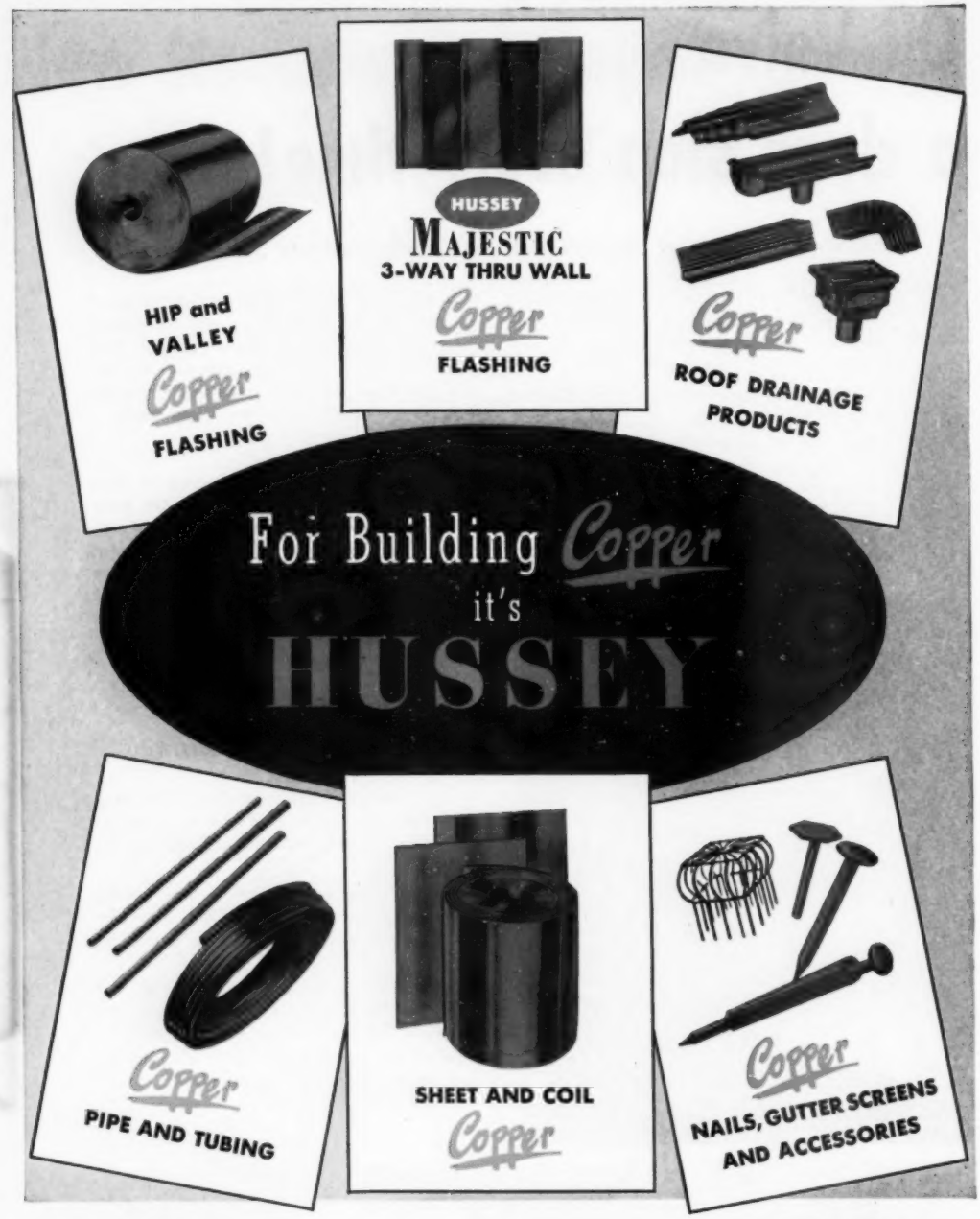
The improved performance of their heating plants has made my customers mighty happy. In fact my regular customers keep sending me new ones.

And because heat exchangers, electrodes, and burner nozzles all stay clean *months* longer, I've had fewer "call backs" on my service contracts.

Believe me, you're missing a bet if *you* haven't tried this new Honeywell V4001 valve!

MINNEAPOLIS
Honeywell

First in Controls



HUSSEY

OUR 103RD YEAR
1848-1951

C. G. HUSSEY & COMPANY

(Division of Copper Range Co.)

ROLLING MILLS AND GENERAL OFFICES

PITTSBURGH 19, PA.

Warehouse Stocks in:

PITTSBURGH.....2850 Second Avenue
CLEVELAND.....5318 St. Clair Avenue
NEW YORK.....140 Sixth Avenue
CHICAGO.....3900 N. Elston Avenue
ST. LOUIS.....1620 Delmar Boulevard
PHILADELPHIA..1632 Fairmount Avenue
CINCINNATI...424 Commercial Square

News Round-Up

Housing Volume Continues High

HOMEBUILDERS STARTED 85,000 new permanent nonfarm dwelling units in August, a slight decline from July, according to preliminary estimates of the U. S. Labor Department's Bureau of Labor Statistics. Private housing starts increased by about 3 per cent to 84,600, but the gain was more than offset by a drop in the number of public units started during the month. Virtually all sections of the country showed some rise in private housing activity.

In spite of the restrictive effects of Regulation X, the volume of housing starts during the first 8 months of 1951 (758,500 units) has exceeded that of the comparable period of any year on record, with the exception of the peak year 1950. The continuing high volume of residential building activity and the recent relaxation of credit restrictions make it seem likely that the government's original goal of 850,000 housing starts for 1951 will be greatly exceeded to make 1951 another 1,000,000 unit year.

June Furnace Shipments

SHIPMENTS OF WARM AIR furnaces increased during the month of June. There were 61,889 units shipped compared to 56,282 furnaces shipped in May 1951. The shipments during June were considerably below shipments of June 1950 however, when 98,517 units were shipped. These figures have been compiled by the Bureau of the Census, Department of Commerce.

Analyzing June shipments by types of fuel gives the following figures: Coal fired units, 11,564 or 19 per cent; oil fired, 22,091 or 35 per cent; and gas fired, 28,234 or 46 per cent. Forced air furnaces amounted to 72 per cent of shipments.

Furnace shipments for the first six months of 1951 totaled 400,856 compared to 381, 151 furnaces shipped in the first six months of 1950.

There were 47,444 oil burners shipped in June this year compared to 80,562 shipped in June 1950. In the total for June 1951 there were 44,158 residential type burners shipped.

Aluminum Production Rises

ADDITIONAL CAPACITY recently placed in operation enabled the U.S. primary aluminum industry to increase its output about eight per cent in July, Donald M. White, secretary of the Aluminum Association, announced. "Part of the increase," he said, "was made possible by the opening of a new pot line in the Jones Mills, Ark., smelter of Reynolds Metals Co. and part by the reactivation program of Aluminum Company of America, in which high-post electric power is being utilized to operate idle equipment for the duration of our expanded defense effort."

Total primary production reported by Mr. White for July was 145,395,271 pounds or about 10.5 million pounds over the 134,906,971 pounds turned out in June.

Shipments of aluminum sheet and plate by member companies of the association's sheet division totaled 93,771,078 pounds during July, about seven per cent over the 87,501,761 pounds of these products shipped in June.

Dirksen To Address Convention

HIGHLIGHT OF the 38th annual convention of the National Warm Air Heating and Air Conditioning Association will be an address by the Honorable Everett M. Dirksen, Republican Senator from Illinois. Senator Dirksen will speak at the luncheon on December 5, opening day of the two day meeting. Scene of the convention will be the Hotel Cleveland, Cleveland, Ohio.

Senator Dirksen was a member of the 73rd to 80th Congresses inclusive. He retired in January of 1949. In 1950 he returned to the political scene to win the Senate seat from Illinois.

He is recognized as a brilliant student of government and has been an avid champion of economy in government in his term in the Senate.

Fan And Blower Shipments

SHIPMENTS OF FANS, blowers, and related equipment in the second quarter of 1951 were valued at $30.6 million, according to the Bureau of the Census. This is a slight increase over shipments of $29.4 million in the first quarter. The value of orders booked during the second quarter of 1951 amounted to $35.8 million, a decrease of 3 per cent from the $37. million for the first quarter.

News Round-Up

ASHVE Headquarters Move

THE AMERICAN SOCIETY of Heating and Ventilating Engineers has moved its headquarters from 51 Madison Ave., New York City, to 62 Worth St., it was announced by A. V. Hutchinson, executive secretary of the society. He said the growth of the society, whose membership has virtually tripled in the past decade, made the present space, occupied since 1930, inadequate.

Sheet and Strip Capacity Up

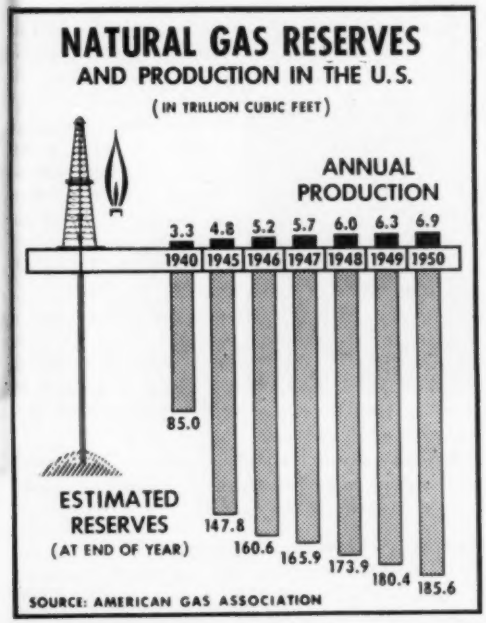
IN THREE YEARS to the beginning of 1951 the expansion and improvement programs by steel companies increased their total hot rolled sheet and strip capacity almost 30 per cent, their cold rolled sheet and strip capacity more than 25 per cent and their electrolytic tin plate capacity 49 per cent, according to data recently assembled by American Iron and Steel Institute.

Largely as a result of the great demand for pipe for natural gas transmission lines, the capacity for making electric weld pipe and tubing increased 153 per cent, from 2 million tons to more than 5 million tons. The total capacity for all types of pipe and tubes including electric weld, rose 43 per cent.

The increase in raw steel capacity was over 10.2 million tons during the three years while the annual capacity for making all types of finished hot rolled products increased about 9,728,000 tons.

The total capacity for hot rolled finished products at the start of this year was over 84 million tons, equivalent to 80 per cent of the raw steel capacity of 104.5 million tons.

With seven fewer open hearth furnaces, steel companies at the start of this year had 7.7 million tons more open hearth ingot capacity than in 1948.



Despite great expansion in the use of natural gas, new discoveries have consistently outstripped production. In the period 1940 to 1950, for example, three times as much natural gas was discovered as was used, and more than 100 trillion cubic feet were added to reserves. Significantly, this chart shows only proved recoverable gas reserves, while some outstanding authorities have estimated total gas reserves still underground to be about 500 trillion cubic feet.

Obituaries

Christopher P. Metz

Christopher P. Metz, 79, proprietor of the C. P. Metz Heating and Sheet Metal Co., Niagara Falls, N.Y., for 46 years, died Sept. 3 after an illness of eight months. Born in Germany, Mr. Metz came to Niagara Falls 65 years ago. He was prominent in the city's business life for nearly half a century. His wife and four daughters survive.

Robert P. Whitmer

Robert P. Whitmer, 53, of 1404 E. Washington St., Bloomington, Ill., former vice president of American Foundry and Furnace Co., died Aug. 15 in Brokaw Hospital. He suffered a stroke at his home and was taken to the hospital.

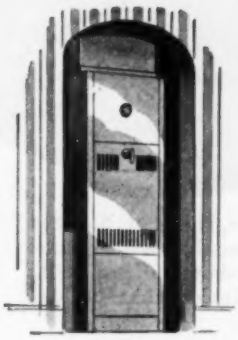
Mr. Whitmer resigned from the American Foundry and Furnace Co. in July, 1950, after being with the firm 28 years. After leaving the firm he expanded the manufacture and sale of a slide rule he had earlier perfected for the measuring of heat loss in buildings and was engaged in this business at the time of his death.

He was born in Bloomington Sept. 6, 1897, son of Le Roy G. and Mildred Whitmer. He married Violet M. Sundblom in Chicago Sept. 2, 1944.

Surviving are the wife, the mother, one sister, Mrs. Mildred Whitmer Kesler, and two nieces.

SU-30-G
85,000 BTU
input per hour

SU-35-G
110,000 BTU
input per hour



AGA Approved!

for alcove and closet installation

Gas-fired RICHMOND winter air conditioner

Where space is tight, use the Richmond SU-G, gas-fired, vertical winter air conditioner . . . ideal for the small ranch-type installation.

Now the SU-G is approved by the AGA for alcove and closet installation. When ordered for this type of installation our standard unit is especially adapted to meet the rigid AGA requirements. When ordering the Richmond SU-G for closet or alcove use, be sure to state that fact.

Remember that the SU-G can be furnished with a bottom filter rack as optional equipment at no extra charge. And remember these special features: Remote pilot igniter (standard equipment) for convenience and safety in lighting burner from outside of furnace... burner and controls quickly and easily removable as mounting plate is held securely in place with four nuts. When space and economy count . . . count on the Richmond SU-G.

RICHMOND PLUMBING & HEATING

RICHMOND

RICHMOND RADIATOR CO.—AFFILIATE OF STEWART-WARNER CORP.

AA-10

Richmond Radiator Company
19 East 47th Street, New York 17, N. Y.

Please send me full information on Richmond SU-G gas-fired winter air conditioners.

Name.....

Company.....

Address.....

use the H&C NO. 74

WITH VOLUME CONTROL

AT THE TURN OF A SCREWDRIVER

Volume Control, as provided in the H&C No. 74 register, is so simple that whether it is done scientifically or by the home-owner, nothing more than a screwdriver is required. It's POSITIVE . . . bound to stay put, with nothing to break or lose and as inconspicuous as a small screwhead.

When price is a major factor, the H&C No. 74 Design register is the register that will enable you to get down to rock-bottom and still provide the kind of installation that builds and holds good will.

IT'S QUALITY-BUILT IN EVERY DETAIL, Construction equal to the finest.

IT PREVENTS STREAKED CEILINGS by downward deflection of fins.

AVOIDS WALL STREAKING by tight sponge rubber seal.

DEFLECTION MAY BE VARIED FOR HEATING OR COOLING.

QUIET IN OPERATION — no valve rattle whatsoever.

CHOICE OF FINISHES — infra-red baked-on prime coat, of a neutral shade that blends well with any decorating scheme and is also a perfect base for decorating, or METALUSTRE, a delightful soft-toned metallic finish.

TROUBLE-FREE INSTALLATION — Duct flange prevents interference of valve with stackhead and simplifies installation.

AN OUTSTANDING VALUE made possible only by the unmatched facilities of the world's largest register producer. See your H&C Jobber or write for current catalog, No. 51.

HART & COOLEY MANUFACTURING CO.

MEMBER INDOOR COMFORT

500 EAST EIGHTH ST., HOLLAND, MICH.
In Canada Hart & Cooley Manufacturing Co., Fort Erie, Ontario

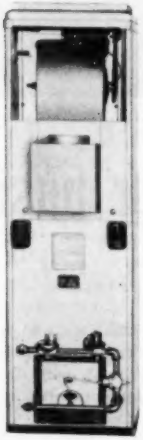
PRODUCT OF THE WORLD'S LARGEST and MOST PROGRESSIVE PRODUCERS OF REGISTERS and GRILLES

Luxaire COUNTERFLOW UNITS for PERIMETER HEATING

Gas Fired . . .

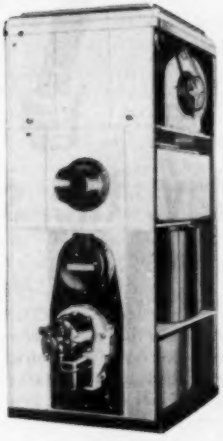
Vaporizing Oil Fired . . .

Gun Oil Fired . . .



No. HC-95-E
Gas Counterflow Unit
95,000 B.T.U. Input

No. VHC-75-E
Oil Counterflow Unit
75,100 B.T.U. at
Discharge Outlet



No. OHC-84-E
Oil Counterflow Unit
with Gun Oil Burner
84,000 B.T.U. at
Discharge Outlet

For the thousands of basementless houses that are installing Perimeter heating or "Crawl Space" heating, choose one of the 3 Luxaire Counterflow Units: (1) Gas Fired (2) Oil with Vaporizing Burner (3) Oil with Gun Burner.

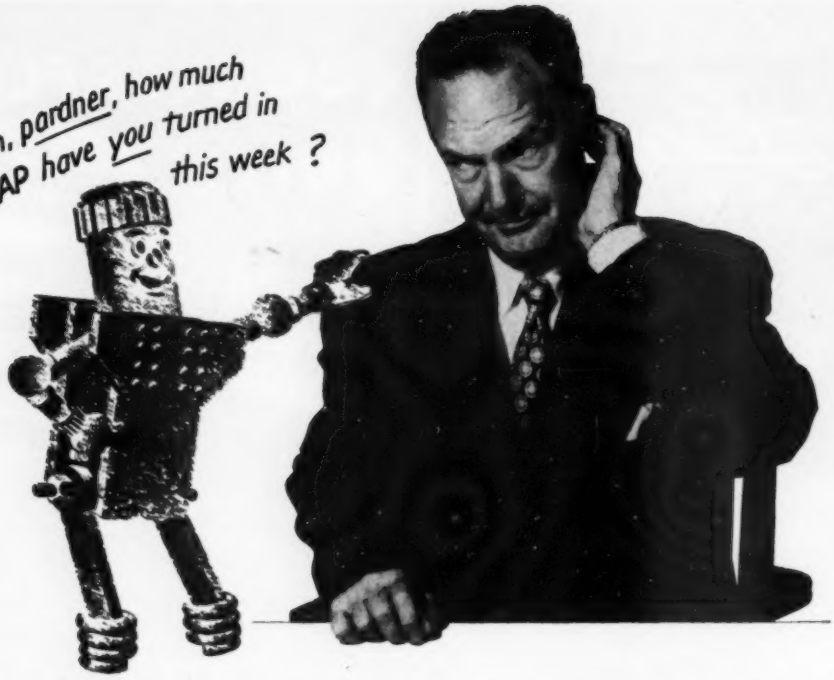
The ingeniously designed Luxaire Units are approved for burning either Gas or Oil — and are equally efficient with either fuel.

With Luxaire install the Counterflow Unit now without the burner. In the Fall install the Luxaire Gas Burner or Oil Burner, whichever your customer prefers.

APPROVED FOR GAS! APPROVED FOR OIL!

THE Luxaire C. A. OLSEN MANUFACTURING COMPANY • • ELYRIA, OHIO

HEATING & AIR CONDITIONING UNITS



Today, the steel business is your business

—*it needs all your SCRAP, Now!*

SUPPOSE that every steel user were suddenly told that he had to turn in a half-ton of scrap before he could get a ton of steel. It would start the most gosh-almighty treasure hunt for scrap that ever happened.

In effect, this "no-scrap, no-steel" situation virtually exists. For without *all* the scrap that industry can search out and start on its way to the mills, steel production will surely drop. It's as serious as that.

More scrap is urgently needed. Today the mills are turning out more steel than ever before. But they're scraping the bottom of the barrel as far as scrap is concerned. Defense and domestic demands for steel simply cannot be met unless at least 100,000 tons of "purchased" scrap roll into the furnaces—*every day.*

The bulk of this scrap must come from industry. That's why we're asking for your all-out help. That's why it's so important that you make the drive for scrap part of your daily operations. Make it your business to encourage every employee to report any obsolete, broken or worn-out machinery, tool or equipment that has seen its day. From this dormant "junk" must come the heavy melting scrap that the mills need most. Don't let your scrap lie idle; send it on its way. How about it, pardner?

You'll find your local scrap dealers listed in the yellow pages of the phone directory.

This page would ordinarily be used to tell you about

U·S·S STAINLESS STEEL

but, because without SCRAP we cannot produce steel, we are asking instead for your all-out help in getting more SCRAP to the mills.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM · UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

1-1326

UNITED STATES STEEL

Arnold Kruckman's

Washington Letter

Aid For Small Business

THE MUCH battered Defense Production Act, signed by the President the last day of July, in nine tightly printed pages of text, establishes the Small Defense Plants Administration. It is intended to give smaller business the means of sharing in defense orders. Congress designed it as an emergency agency to drain profits from big business.

Congress *authorized* the SDPA to have a fund of $50 million provided by the Treasury; gave authority that SDPA might secure loans from RFC to a total of $100 million outstanding at any one time; and directed that an administrator should be paid $17,500 a year, with two deputy administrators each to receive $15,000 a year. Congress sought to provide a way by which smaller business might quickly share in defense business, which was wiping many smaller units out of existence. The last line of the sections establishing SDPA ordered: "This act, and all authority conferred thereunder, shall terminate at the close of June 30, 1952."

This is written September 19. By the time Truman signed the act the actual existence of SDPA was limited to 11 months. Forty-nine days have passed since he validated the act. At the very best, if the will of Congress concerning SDPA were made effective now, immediately, by the White House, at least two more months will have elapsed giving SDPA only nine months of life. It is doubtful if the ponderous machinery of government could be put into operation, that small business would have the benefit of the law for a full nine months, as the situation exists today.

No Pressure

Truman's reluctance to pass out jobs totaling $47,500 is puzzling, to be mild about it. Obviously these plums would have the effect of a chain reaction. They would carry with them the seed of many other appetizing benefits for the faithful. But there really is not much mystery about the delay. It is true there are millions of smaller business people who would benefit from the application of the law. It is true these small business people vote, and presumably are represented by pressure-group organizations. But actually these millions of small business operators are the most helplessly unorganized people of the nation. The imposing organizations function chiefly for the benefit of those who operate them. It has been estimated the smaller business people, their employees and related interests, total approximately 40 million. They are the part of the population that has had, overall, a smaller share in the increase in income, since prices ballooned, and the worth of the dollar has been cut in half. They have not garnered the profits of organized labor nor of organized agriculture.

The existence of SDPA was made extremely shaky even before it was born. Defense Mobilizer Charles E. Wilson openly and impatiently inveighed against it when it was first suggested, months before the law was enacted. He pounded the table about it when the 55 senators formally proposed the creation of SDPA back early in June. Wilson honestly thinks small business is more or less a nuisance. He feels it should be appropriately integrated with larger units. He said it was a bother while he was with WPB during World War II. He had nothing good to say about the Smaller War Plants Administration of World War II. He decidedly wanted no SDPA. He told Congress he thought the sop thrown to smaller business people in the form of the Office of Smaller Business, the joint catchall for DPA and NPA, is quite sufficient. Incidentally, James L. Kelly of the Office of Small Business of the Department of Commerce, is now deputy director of the Office of Small Business for the joint purposes of DPA-NPA which continues to be under the authority of Commerce Secretary Sawyer. Kelly, a genial bureaucrat, has taken over in place of John Pritchard, of Denver, who went home, more or less in disgust, when he realized that the thing he was heading was like that little man who wasn't there.

Temporizing

It seems clear Defense Mobilizer Wilson and Defense Production Administrator Fleischmann deemed it scarcely worth while to appoint a new head of the DPA-NPA Office

Washington Letter

of Small Business until the fate of the thing Congress wanted to bring into existence finally is settled. Mark, also, that Secretary of Commerce Sawyer is very sour about the desire of Congress to bring into being another agency for the benefit of small business which would not be under his control. Sawyer, who hates to give up anything that he once gets under his control, has let it be known that he wants the SDPA to become a part of the Department of Commerce.

Open Defiance

Thus, there is a situation in which Sawyer openly defies Congress, and is putting forth all possible pressure either to capture the SDPA, or to kill it; while Wilson and Fleischmann have about the same idea in its relation to ODM, DPA and NPA. On top of that, there is well-defined evidence that Michael DiSalle, who wishes to be governor of Ohio, would not be adverse to having his finger in the SDPA pie. It will be remembered, not so long ago, the OPS, with considerable flourish, brought into existence a very imposing division, with complex purposes, clothed with glittering gobbledegook, to supply more blessings for small business. It is wonderful how everybody in government, and in politics loves small business, with a capital L — like Fagan loved Oliver Twist.

There have been constant rumors that the White House would appoint various persons administrator of SDPA. Undoubtedly the interests of different persons and organizations fostered these suggestions. For instance, the National Federation of Independent Business, which claims a membership approaching a million, with a half a million dollars a year income, and heads up jointly in Burlingame, Calif., Cincinnati, Ohio, and Washington, D.C., has suggested the appointment of Ernest H. Gaunt, of Lawrence and Andover, Mass. Gaunt has long been a supporter of the federation, is one of its vice presidents, and conducts a textile darning business. He is an alumnus of Dartmouth College and has for years conducted a lively correspondence all over the world with persons who are conspicuous, and have vision as well as visions. Mr. Gaunt does not mean anything politically; he is honest, has vigor and imagination. So Gaunt's appointment is more than remote. They have also mentioned John Carroll, formerly in Congress, one of Truman's lame ducks. And it has been suggested that it would be nice to give the job to Nat Dyke, formerly a member of the Smaller War Plants Administration of World War II, a very liberal Democrat, and a man with some experience as a bureaucrat in a government small business agency.

A Good Man

Probably the most logical and sensible suggestion is that the appointment should be given to John E. Horne, administrative assistant to Senator Sparkman of Alabama, who sponsored the establishment of the SDPA. Horne has political acumen, is intelligent, and has good balance. He probably has about as much to do with the problem of smaller business as any person on the Hill. There is little doubt his abilities and understanding are responsible for Senator Sparkman's eminence as the champion of small business in the Senate. Of course, this would bruise the sensibilities of Secretary Sawyer who thinks it would be very clubby if the White House would appoint his man Kelly. The White House has given signs and gestures as though it might announce the appointment of someone. But there is really no clear indication that anything may happen immediately. Truman is in no mood to do anything that would rile Wilson. He went against him in the critical labor problem, and he almost lost him. It took some tall talking and persuasive pleading to induce Wilson to stay. He is now Truman's man; but Truman also has to toe the Wilson mark. If and when Wilson agrees to the appointment of an administrator for the SDPA there is no doubt the appointment will be given to some safe and sound patriot of Fair Deal persuasion who knows little about small business but knows a great deal about pulling out the votes next year.

Is it likely an announcement will be made? We now have a curious situation by which the inertia of the White House casts a spell of inertia on Congress. Congress says there will be no appropriation to validate the $50 million authorization until the White House has designated an administrator. Senator Sparkman is quite frank about it. In his weekly staff report to the Senate small business committee he quotes a statement by the National Federation of Independent Business which definitely accuses Truman of attempting to

(*To page* 28)

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Kruckman —

override the will of the Congress by sidetracking the existence of the Small Defense Plants Administration. The statement bluntly says that the only condition under which the President would put the administration in operation would be if Congress would turn over to the White House a blank check on behalf of the SDPA.

Senator Andrew F. Schoeppel, (R., Kas.) member of the senate small business committee, on September 17, on the floor of the Senate, took the President to task for doing nothing about the legislation passed by Congress to make small business "a full partner in the mobilization program." He showed that President Truman has frequently criticized Congress for its lack of action, but after Congress took the initiative in proposing SDPA, "100 days later, no action has been taken by the President to show that he is cognizant of our desires and our wishes and the law of the land on the subject. . . This is prime and concrete evidence of a 'do-nothing President'." Senator Schoeppel underscored Congressional action on behalf of small business was completely non-partisan, "to protect the interests of the many thousands of small business men whose very existence is threatened by the present mobilization effort. . . Congress again has been treated to the unedifying spectacle of a good law, soured by poor administration, or rather, by no administration at all; by plain neglect and starvation."

Appropriation Blocked

The House appropriations committee has further contributed to the stalemate by refusing to appropriate $25 million, suggested by the budget bureau, in order to launch SDPA. The House committee reported it does not think funds should be supplied "until such time as an organization is formulated with definite responsibility properly coordinated with existing small business functions of other governmental agencies, especially the Department of Commerce." Secretary Sawyer, in a letter to Congress, stated flatly: "I do not propose to agree, and will not agree, in the absence of an order from the President, to any transfer of staff, or activities, from my department to the new agency." Sawyer demanded that no appropriations be made for SDPA until a satisfactory administrator is appointed and has formulated a satisfactory program. This again gives us the now familiar spectacle of a subordinate official of government telling Congress, the board of directors, that he will not obey its wishes, or follow its program and directions as supplied in the law it has enacted. He makes it quite clear he will take his orders only from the President. If you think Congress likes this attitude on the part of its employees, ask them about it.

The House committee has found there are already ten branches of government which in some way are supposed to be extending some sort of aid to small business. When it looked into the matter the committee found this aid largely conversational, and imaginary, and the committee came to the conclusion that the activities of these

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Kruckman —

ten government agencies should be subordinated and merged into the functions of the SDPA, during the life of the emergency. The situation is a vicious circle. The White House will appoint no administrator to set up a proper organization until Congress appropriates a blank check for millions to be spent by SDPA as the President desires. Congress refuses to provide the blank check until the White House tells Congress, in some detail, how the money will be spent. Meanwhile, more and more billions in defense funds are being distributed as orders, but there is no effective agency, such as the proposed SDPA, to see that smaller business actually gets some of the defense orders, in fact and not in theory.

Organization Needed

If smaller business were properly organized, with other minority groups, to make its pressure felt in the White House, and in the agencies responsive to the White House, such as the Department of Commerce, something would happen swiftly. Sawyer would talk to small business as well as to Truman, whom he regards much as those classic families of New England, when it was said that the Cabots talked to the Lodges, and the Lodges — talked to God. Smaller business is represented by friends in the Congress. Therefore we now have a situation in which we find Congress striving to do something for smaller business which is checked by Truman, Sawyer and Wilson. The other day a former senator declared that the executive part of this government, had managed, by means of extracting blank checks from Congress, to obtain control of nine-tenths of the functions of the government. Congress is aware of what it has surrendered, and is trying to recapture some of its powers. This former senator, incidentally, urged that Congress might cancel those powers which it has given up, and simply leave to the executive the powers which Congress actually believes the executive needs to carry out the will of Congress. In other words, Congress may soon demand that it be given an exact statement and blueprint for all actions of the executive in connection with expenditures, such as it is demanding in connection with SDPA.

Definition Sought

Typical of what NPA does for small business, which it regards as ultra important, is its recent report of a six months survey across the nation to find "an acceptable definition of small business." Energies of many persons and large sums of money, were used to find out "there can be no single definition for small business." It is stated solemnly, in some industries, no establishment exceeds 50 employees; in others there are not less than 500. In still others there are less than 100. NPA found the largest number of small manufacturers employ between 50 and 100 persons. It apparently was amazed to find that in some categories those who employ 2,500 persons still are small business. It had not occurred to NPA's investigators that it is a small steel plant which has only 2,500 workers. (*To page* 146)

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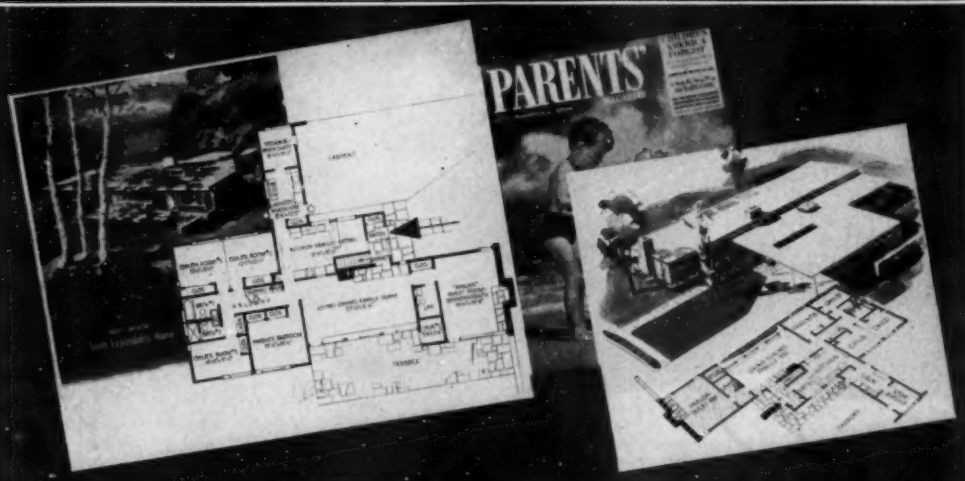

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Choice of AMERICAN-Standard Unit *provides good talking point* when selling modernization jobs!

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For details of the Mohawk and information about the special warm air heating promotion material now ready for you, contact your wholesale distributor.

The MOHAWK Winter Air Conditioner is available in eight sizes, from 80,000 to 300,000 Btu input per hour. Has durable cast iron heating element, dependable controls, efficient burners. Completely automatic in operation.

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COMPARE THE PRICE . . . You'll agree that, dollar for dollar and feature for feature, Wysong is the best shear buy on the market.

Wysong builds a complete line of Power Squaring Shears for the Sheet Metal Shop. See Your Dealer or write for Catalog No. 44.

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VICE PRESIDENT-GENERAL MANAGER

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When your hot prospects want *any* particular model in the Norge Heat line, you can depend upon us to provide it. That's because we warehouse the *complete* Norge Heat line—and we deliver the right model to you *right away.*

We've been doing business as distributors for Norge Heat for some time . . . and we're doing fine, thank you. So are our dealers. And so will you . . . if you take on Norge Heat through the Henry N. Clark Company.

Here's why:

The acceptance of the Norge Heat line by our dealers has been exceptionally enthusiastic. Naturally, they enjoy handling a fast-moving line.

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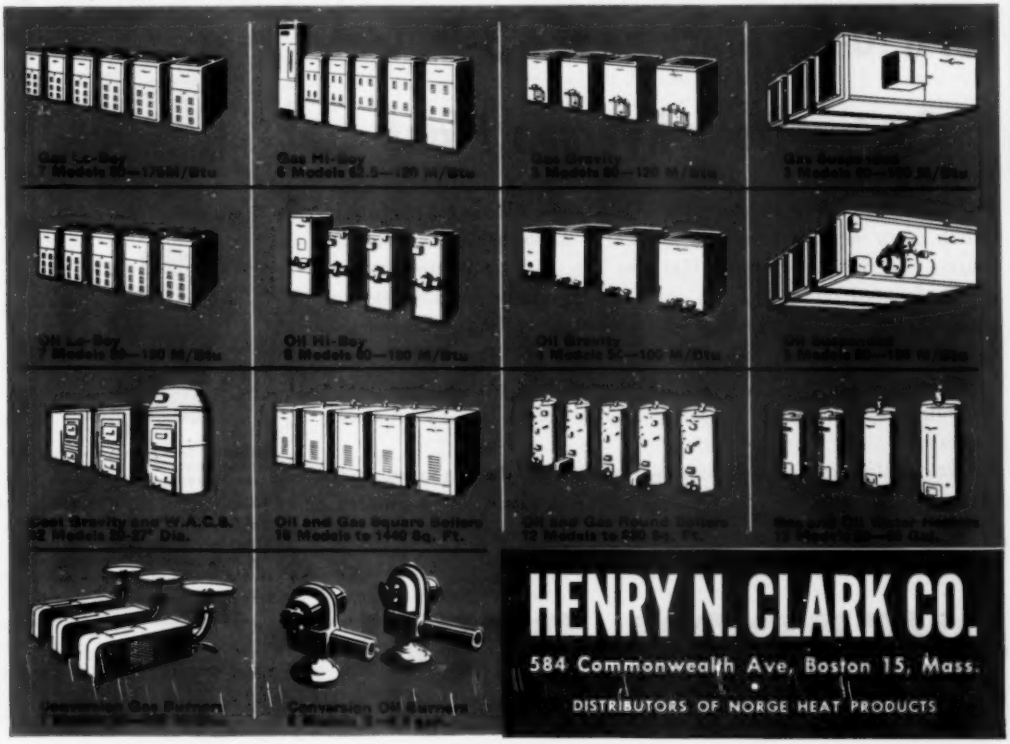
Certainly, Norge Heat is the "rising star" in the heating field! We and our dealers are rising with it . . . *and you, Mr. Dealer, can join us!*

If you're located in eastern Massachusetts, New Hampshire, or Maine, we'd like to show you *all* the benefits to be derived from handling the Norge Heat line. Why not get in touch with us *soon?*

Buying, Selling or Installing . . . "Living's a Treat with Norge Heat"



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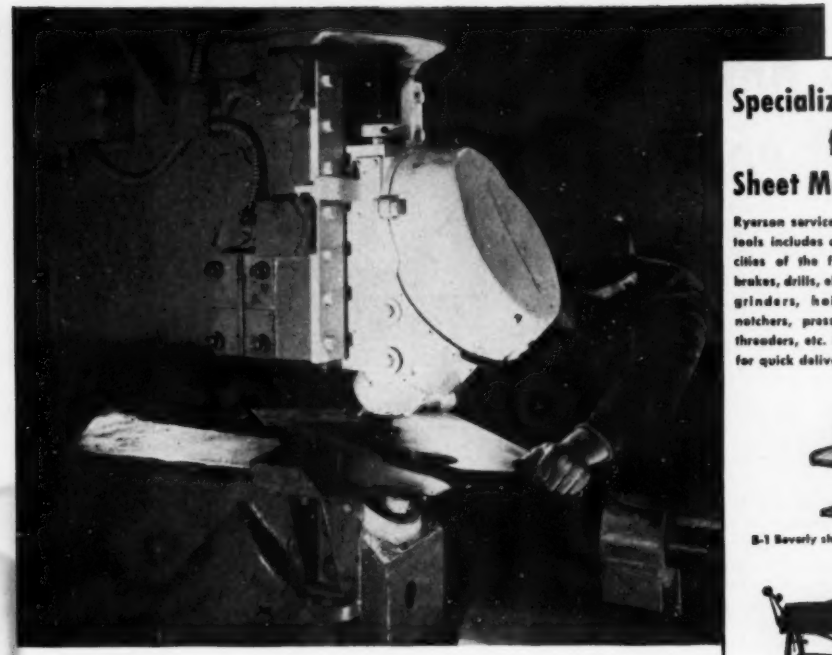

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All have been carefully selected for superior performance and dependability—many on the basis of experience in our own steel operations.

Modern time-saving tools can help you offset the high cost and shortage of manpower. So we urge you to consult our engineers on ways to speed up work and cut costs. For complete specifications, prices and delivery, contact our nearest plant.

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AMERICAN ARTISAN

The Time Is Now

THIS YEAR the warm air heating industry has been pressed to keep sales volume up to production capacity. After several years of expansion which edged capacity to a rate exceeding one million furnaces a year, there is some apprehension whether the pace can be maintained in peacetime. This opinion exists after discounting the effects of material shortages and fuel restrictions. Putting it bluntly, too many warm air heating contractors have felt too secure and satisfied with their operation in recent years to be concerned about the future when the industry will have to compete with other industries for the consumers' dollar. All surveys show that the present production capacity is not excessive, provided contractors adopt a heads up attitude to meet the coming competition.

At the beginning of another busy heating season, it is easy to be lulled into a false sense of security and emerge next spring with the expectation that flush times will continue indefinitely. But the shrinkage has already been felt at the manufacturing level and to a minor degree among contractors. Expectations are that it will be more pronounced next year, but influenced by the progress of the defense program.

The present status of our production capacity, the excellence of our product, and public acceptance of automatic fired warm air heating, brings up the question how we arrived at this position.

The course of the industry during the past five years has been transitory. Panel heating and other innovations had captured public fancy, after having promised tantalizing impressions of performance and comfort, and made a serious bid for the residential heating market. There was some question whether warm air heating could maintain its leadership. But productive ingenuity and aggressive action by leaders in the industry dispelled this concern by effectively satisfying the demand for improved performance. Warm air was readily adopted to the newer concepts of *Indoor Comfort*, especially in modern construction. Under this program, perference for warm air heating was not only maintained, but increased.

All this did not happen by a simple twist of the wrist and many contractors were not aware of the effort expended to preserve their market. Many contractors today remain oblivious to the threat, the advancements that were developed to meet it, and the demand for improved performance and comfort.

Through a program that required imagination, foresight, and research, continuous air circulation and perimeter heating became representative of advancements which contributed significantly in maintaining and expanding the market, for modern heating equipment is being sold today on a basis of obsolescence instead of the old furnace being in a state of collapse.

Progressive contractors have recognized this new era in warm air heating and have organized their business to meet the new demands of the expanded market by adopting sales, engineering, installation, and service policies to serve it. These contractors have also recognized that the new market is not without responsibilities. Expanded production must be maintained, within the restrictions imposed by the defense program. Everyone is morally bound to expend every effort in maintaining the production capacity of the industry because it is symbolic of public acceptance. Deterioration of capacity would imply lack of acceptance and degeneration within the industry itself, and no one can withstand this implication individually even within his own community. Manufacturers have a logical right to expect dealers to support production in the same manner as a dealer expects a furnace to be available and delivered when he orders one.

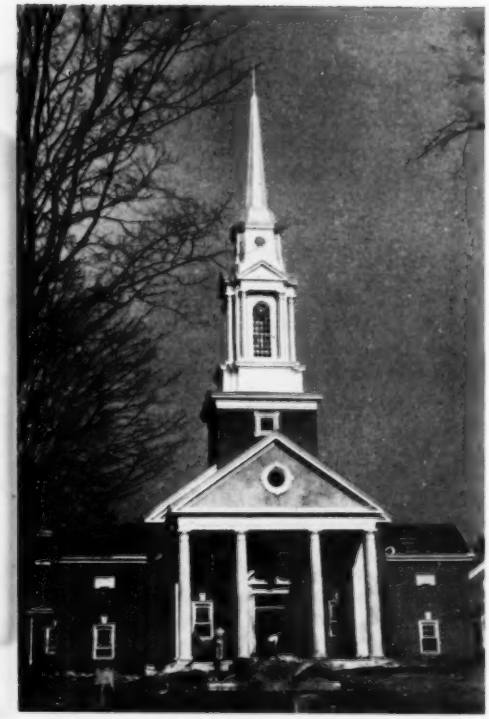
The time is now for all dealers to accept new responsibilities in engineering standards, techniques, sales, and service. Ignoring technical advancements, neglecting promotional activities, and shirking service responsibilities has become the badge of the incompetent. Survival in the coming competition will depend upon the action taken today on these policies.

Wide Use Of Sheet Aluminum Sets New Note In Architecture

Architectural applications of aluminum have been growing as the metal became more abundant. This church provides a fine subject for decorative treatment with aluminum sheets.

R. C. NASON

Great Neck, Long Island



Aluminum was chosen for most of the decorative work on the Community Church because of its beauty and durability.

AN OUTSTANDING example of church sheet metal work can be found in the new Community Church in Garden City, N. Y. One of the chief features of this structure is an unusually wide use of aluminum alloy. All sheet metal work at or above the main gutters is aluminum. One sheet metal contractor, H. Klein & Sons of Mineola, Long Island, also furnished and erected several tons of sheet copper in areas below the main gutters.

Illustrations show the attractive appearance of the early American style building. Its bell tower, cupola and spire are all surfaced with aluminum as a departure from the use of wood.

Aluminum Uses

The portico has large Doric columns of redwood, a traditional material. Above the capitals of the columns is a facia of aluminum surmounted by a pediment with cornices and gutters also of aluminum. Facia depth exceeds 2 ft and features a central molding strip to relieve the flatness.

The base edge of the facia has been folded under 90 deg for an 18 in. soffit. The metal is then carried up to cover the inner pediment supporting beam surfaces while the top edge of this interior sheet terminates above and within the portico ceiling of stucco. As the portico is 30 ft long and 9 ft deep the full length of this application is 48 ft.

Architecturally few church styles surpass the Colonial in beauty. Coupled with liberal use of aluminum the result has been an ornamental landmark of unusual attraction. Sheet metal men might consider the fact that this example points to a possible enlarged use of aluminum for this type of construction.

The Bell Tower

The lowest section of the bell tower is 12 by 12 ft. Into its sides were inserted 2 by 2 ft aluminum ventilation louvers and it is topped with a cornice of the same material.

The bell tower has twin columns at the corners and long opaque glass windows surmounted with pediments.

A standing seam roof of 16 oz copper was applied to this bay window to provide contrast with the aluminum.

The close-up of the leader shown below is an example of the welding specified at offsets.

Though windows of this type are often left open to permit the carillon to be heard, the Garden City church has no chimes so the openings were glazed to conceal internal steel framing. This church has substituted electronically amplified chimes for bells. Loud speakers are located in the coupola behind the round louvers. These louvers are 18 in. diameter, one for each of the four speakers.

The cupola is octagonal for the corners are narrow, flat panels oxy-hydrogen welded to the larger sides. The cupola roof is likewise octagonal of aluminum sections welded together.

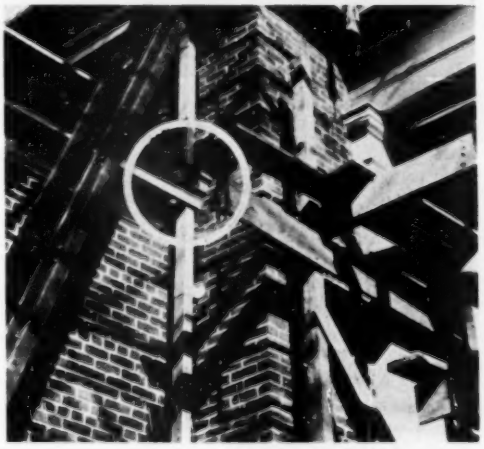
Spire height is 22 ft topped by a gilded weathervane 4 ft long. The spire is octagonal and made of panels fabricated in the Overly Company plant in Greensboro, Pa. The Overly concern fabricated and installed almost all the aluminum work. Spire sections were locked together on location and then attached to aluminum backstraps for rigidity and weathertightness.

Rigidity is further guaranteed by the use of internal steel bracing. The weathervane is mounted on a steel shaft which rises from the cupola base. This shaft has been strengthened through the use of diagonal steel angles and is well anchored at the base. Maximum height of the spire is 100 ft.

Gutter Construction

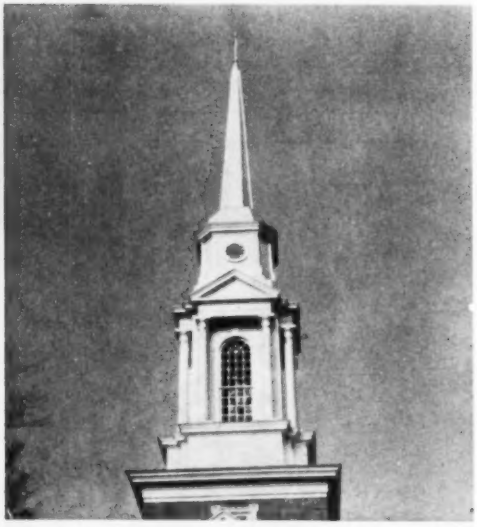
Perimeter of the building is 700 ft with formed aluminum gutters installed all around except at the gable ends. The main gutters are each 200 ft long, 5 in. deep, 3 in. wide at the bottom and 6 in. wide at the top. Welded aluminum braces were installed at the top edges while ½ in. aluminum mesh was locked into gutter straps throughout at 4 ft intervals.

Under the gutters is found a seven-folded deep cornice of aluminum. Crown sheets were locked into the gutter bottoms, a layer of mastic applied and both divisions fastened to the structural framing. While the top facia is only 5 in. deep the total cornice depth is 25 in.



In the circle can be seen the intersection of the main roof leader and a wing gutter. This joint was welded to insure tightness.

The columns are of redwood and the aluminum used above makes the portico a striking part of the church structure.



Aluminum was applied to the entire church tower. The round ports just below the spire are openings for the chime loud speakers.

One photograph shows how two main roof leaders pass down through wing gutters. This intersection had to be welded for tightness. Some of the upper sections of the leaders were slipped together and fastened with metal screws. Joints representing direction changes such as offsets and areas where leaders joined gutters were welded. Welding was also specified in gutter miters, corners and areas where appearance and weathertightness were important. Simplicity is the keynote of the architectural design of this church and the leaders are plain and rectangular without fancy heads or embellishments on the wide straps.

Welding Aluminum

In discussing the welding of aluminum a representative of the contractor explained that it is necessary to avoid cracking in the weld zone and that 52 S welds better than 3 S. Butt or edge welds give the best results and indications are that lap and fillet welding are not most suited to welding aluminum.

Oxy-hydrogen welding is recommended for aluminum because it allows the use of larger tips than oxy-acetylene welding and has a lower temperature. It is good practice to adjust the torch to show a neutral or reducing flame, which means two parts hydrogen to one part oxygen. The use of aluminum rod of suitable composition is recommended.

Durable Finish

Another interesting phase of this church installation is the aluminum finish on kitchen equipment where etching and lacquer were used. This satinlike exterior eliminates brilliance while the lacquer provides excellent protection. The etching was done in caustic baths and the material well rinsed and dried prior to application of lacquer. This lacquer prevents accumulation of patina but retains the natural clean finish of the basic metal as long as the coating remains intact.

When lacquer of this type is used on aluminum surfaces it is very important that the surface be as clean as possible for best adhesion. This indicates a need for vapor degreasing, rinsing and careful wiping in preparing the surfaces. Lacquers containing aluminum pigment have been found durable because of the tiny flakes of aluminum which protect the lacquer from destructive action of sunlight. Other durable lacquers contain synthetic resins and call for the use of primers. Varnish has a tendency to yellow with time and exposure.

Copper Used

Several notable applications of sheet copper were made on this church. One prime example is the standing seam roof of the large bay window. This was installed by H. Klein & Sons as were the copper flashings. Klein also installed 120 squares of slate roofing.

While aluminum is not plentiful at the present time the productive capacity of the industry is such that there should be an ample supply for architectural applications in the future.

Saving Seconds Saves Dollars

LAWRENCE E. GICHNER
Washington, D. C.

It is not always possible to reduce labor costs but it is important to keep an exact record of them so that every cost is included in the final bill. These forms are of great value in recording costs.

"THE sheet metal contractor must be acutely observant of details if profits are to be made" says Alfred P. Ferraro, general manager of the Consolidated Air Conditioning Co. of Philadelphia, who has developed both office and shop techniques that give evidence of tremendous improvements over old methods. Analysis of the methods of this organization will interest the progressive dealer who is profit conscious.

But first a brief word about Ferraro who has had a rapid rise in the sheet metal industry. At 13 he was swinging from a bosun's chair repairing sheet metal stacks; at 22 years of age he was foreman over 1,400 men in the Cramps Ship Yard, Philadelphia. Today at 32 he heads his own firm with an average employment of 32 mechanics. He is living proof that success stories still can happen in this modern age.

Office Form

During two years of study Ferraro has developed a job cost record form that gives complete information on a job all on one page. One person can easily keep it up to date. As a result it has lowered office expenses while increasing accuracy. It has many columns with headings for every possible expense that could go into a job and immediately signals by absence any item inadvertently omitted. (Page 40)

Seven major headings are:

Contract and Billing Data
Credit To Work in Process
Raw Material
Fabricated Materials and Parts
Wages
Subcontractors
Other Costs

These key classifications are again broken down into special groups. For further understanding of this thought provoking system let us give attention to the three important groupings under wages — Shop, Field, Draftsman.

Wages as we well know, form the largest single job expense. This three fold breakdown is particularly significant.

CONSOLIDATED AIR CONDITIONING CO.
CUTTING LIST

Job No._____
Job Name_____

Quan.	Sizes	Gauge	Mat'l.	Type	Connection	Fr. Mtr.	No. Reqd.	Remarks

Fig. 1 This cutting sheet simplifies the problem of recording metal used on an installation.

JOB COST RECORD

Description

Customer's Name _____ Job No. _____ Date for Completion _____

Address _____ Customer's P. O. _____ Estimated Cost _____

CONTRACT AND BILLING DATA

ORIGINAL CONTRACT	ADD ON	DEDUCT	DATE BILLED	BILL NO.	AMOUNT BILLED	BALANCE TO BILL

CREDIT TO WORK IN PROCESS

RAW MAT.	FAB. MAT.	WAGES-SHOP	WAGES-FIELD	DRAFTSMAN	CONTRACTORS	TRUCK RENTAL	MECHANICS EXP.	PERMITS AND BONDS

COST DATA

RAW MATERIALS

DATE	MEMO	AMOUNT	DATE	MEMO	AMOUNT

FABRICATED MATERIALS & PARTS

DATE	MEMO	AMOUNT	DATE	MEMO	AMOUNT

WAGES

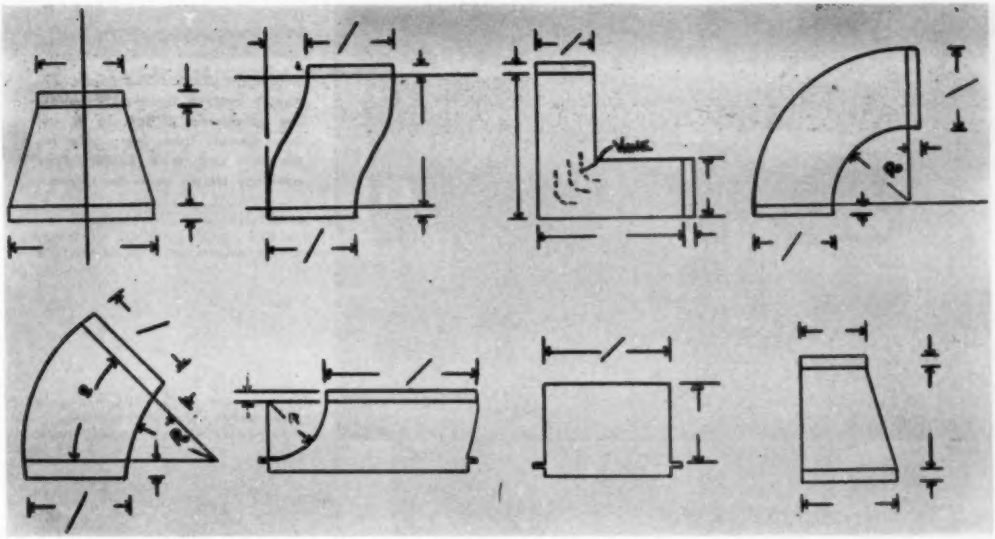
DATE	HRS.	SHOP AMOUNT	HRS.	FIELD AMOUNT	DRAFTSMAN HRS.	DRAFTSMAN AMOUNT

SUB-CONTRACTORS

DATE	NAME	AMOUNT

OTHER COSTS

MECHANIC EXP. DATE	MECHANIC EXP. AMOUNT	PERMITS & BONDS DATE	PERMITS & BONDS AMOUNT	TRUCK RENTAL DATE	TRUCK RENTAL AMOUNT



Drafting Department is Important

Ferraro lays great stress on the concentrated importance of the drafting department and the part it plays in speeding production by making it responsible for correct planning and thinking. The success of a profitable job starts on the drafting board, Ferraro believes.

If a duct system is correctly laid out to scale with all seams indicated, it is a quick and simple matter to take off the size of every single piece of elbow, taper or straight pipe.

Printed Forms Save Hours

Instead of making a separate sketch for the mechanic for each item to be fabricated, hours of time are saved by a series of printed drawings of elbows and various fittings that simply require the dimensions to be filled in along with the gauge. Fig. 3.

All of this is prepared by the drafting department and saves the mechanics considerable time. With the dimensions in front of him, he knows what is required without wasting speculative minutes or hours figuring out what is required.

One mechanic does all the cutting at the shears. Supplied with a cutting list — again on a printed form to save time — he supplies the shearing needs of all the mechanics in the shop. Fig. 1. This again centralizes responsibility and saves time because the shear man knows what pile to search to find the most economical sheets that will finish to the required sizes. Secondly he knows, since this is his specialty, just where to find scrap and waste items that will turn to useful pieces.

Who has not seen mechanics waste precious minutes searching through piles of waste scrap hoping to find

Fig. 2 Facing page.

Job No. ..... Mat'l. .....

Sk. No. .....

Piece No. .....

Made by

Fig. 3 Pads are made up in 4¼ by 5 in. size with the sketches shown above and the printed material about job number, etc.

the right size of material and in the end having to cut into a full sheet any way. This aimless search is avoided.

Printed Sheet Form Used

This shearman also reports all sheets used on each particular job. This responsibility is again simplified by the use of a printed form listing the various gauges which provides a space to list the size, quantity and job number. For efficiency these forms are assembled in a pad which for convenience remains right at the shears.

Bolts, screws and rivets are not charged to a job. In a year the cost of all these pieces would amount to a thousand dollars says Ferraro, but the time of counting and charging them would far exceed their actual expense.

Records Provide Accurate Picture

As noted before on the job record form wages were further classified into Shop and Field. This sensible breakdown provides further check and recheck. Check to compare percentage of job progress with estimated figures. Recheck on completion to compare actual cost with estimated cost and to study any deviations and the reasons for them.

This single, 2,000,000 Btu capacity heater heats a three-story building containing 26,000 sq ft of floor space. Ducts carry heat to the first and third floors. The openings shown heat the second.

Single Warm Air Unit Of 2,000,000 BTU Capacity Heats Three-Story Commercial Building

Warm air heating continues to find additional applications in commercial and industrial buildings. Satisfactory performance and economy are the results.

WALTER L. DAVIDSON*
Pittsburgh, Pa.

SUBSTANTIAL FUEL economies and more efficient temperature control for employee comfort and spray painting operations have resulted from the installation of a modern automatic gas fired warm air heating system in the S. A. Hite & Sons auto body repair and paint shop, Altoona, Pennsylvania.

The three-story brick garage building containing some 26,000 sq ft of floor area previously had been heated by a steam radiator system with steam supplied from a coal fired boiler. Control of this system was not automatic and temperatures throughout the building were never uniform, Park S. Hite, one of the partners of the firm, explained. In addition, a 20 KW electric heater had to be used in the spray painting shop on the third floor to maintain 75 F for maximum efficiency in painting autos.

High Costs

Even more of a problem according to Mr. Hite, was the cost of operating the boiler system. Besides having to use one man to keep the boiler going, bills for coal and for ash removal in the 1949-50 heating season (eight months) totalled $1,682. This amount does not include the cost of the fireman's time of the 20 KW electric heater formerly used to supplement the heat required for the paint shop on the third floor.

To overcome these difficulties, the company investigated the possibility of converting the steam boiler from coal to gas. Cost for this conversion seemed excessive so it was decided to supplant the existing boiler with a warm air heating system.

In November of 1950, one gas fired space heater was installed on the second floor of the building, with ducts to carry warm air to the first and third floors. The entire installed cost of the gas fired heater was approximately $1,000 less than the price quoted for converting the steam boiler from coal to gas, not counting additional expense of repairing radiators and piping.

*Sales Manager, Heating Department, Dravo Corp.

The first floor of the building is heated by the duct which can be seen above the wheel alignment rack.

At the right below is the paint spray department on the third floor. This area is maintained at 75 F for maximum efficiency in painting.

Directly below is the exterior of this three-story building. Warm air saved $956.17 in fuel costs during the first season of operation.

What has been more advantageous than the initial cost savings is the economy of operating the gas fired heater, even during unusually severe winter weather in 1950-51. For six months gas bills totalled $622.14, or an average of $103.69 per month. This period was from November 1950, to April 1951. The fuel cost of $103.69 per month with the gas fired heater is about 50 per cent less than the average of $210.25 per month with the steam boiler using coal for fuel. In addition, being fully automatic, the heater requires no attention by personnel. This has released the services of one man for other duties.

Specification

The heater installed at Hite's has a capacity output of 2,000,000 Btu per hour. To conserve space, it is placed in a horizontal position on a steel platform on the second floor. Space under the platform can be used for storage. Because the heater has a stainless steel combustion chamber and requires no refractory lining, it could be installed in the horizontal position wihout any major alterations.

No ductwork is used on the second floor where sheet metal and body repair work is carried on. Four discharge nozzles of the heater empty into a sheet metal housing from which two grilled openings distribute heated air on the second floor, one duct drops to the first floor and another duct runs to the third floor.

The problem of precise temperature control is more acute on the third floor than in any other area. Temperatures on the first and second floors are maintained at 65 F for employee comfort but the third floor must be kept at 75 F. Air is recirculated to the heater from the first and second floors but all the air from the third floor is exhausted to the outside by a large ventilating fan.

A constant temperature of 75 F is required on the third floor to assure quality paint jobs on bodies. First, the metal of the body itself has to be at a uniform temperature so paint will flow evenly. Second, spray guns do not operate properly if the temperature fluctuates. When the 20 KW electric heater was used, a temperature of 75 F could not be maintained uniformly. Open-flame burners were not permitted in the room because of the explosive fume hazard. Windows on four sides for

(*Please turn to page* 150)

The modern winter air conditioning unit allows space for a recreational area in the basement.

Studying the opinion of the final consumer can help in planning sales appeals. Here is an actual testimonial from a satisfied user of warm air heat.

By
A Happy Homeowner

A Consumer Reports On Warm Air Heating

ONE OF the oldest principles of salesmanship is to sell what the prospect wants to buy, and not what you have to offer him. In other words, this old (and still very valid) rule demands that you offer him satisfaction, then propose your products and service as the means to obtain that satisfaction. It is a good rule to follow in advertising as well as in person-to-person selling.

Here is a consumer's reaction to warm air heating with gas. It is a list of advantages I have found in actual day to day use of this type of heat in my own home. It is not offered as a final list of everything consumers want, but rather as a report of what one consumer liked. Since it is probable that my own likes and dislikes when it comes to heating are pretty much like the next man's, these points might be used with real advantage as *Indoor Comfort* sales clinchers to convince a prospect for warm air home heating.

The facts are: A few months ago, we moved out of a cramped apartment which was too small for two children and purchased a new home. The apartment had been heated with fair comfort and great expense by single gas heaters placed in every room. The new house has a gas fired winter air conditioning unit. My wife and I have discovered a number of things we like about warm air heat—and no ways at all in which it does not compare favorably with hit-or-miss room by room heating.

Advantages

The advantages that have impressed us most are:

Economy. In New Orleans, gas and electric bills are rendered together by a single utility company. During cold weather, the combined invoice was $15 to $25 every winter month.

Recently, we had a pleasant surprise. The coldest month of this winter made us expect a very large bill. But the combined electric and gas service cost only $12.35 with warm air. A similar month in our former apartment would have cost more than $20.

Safety. With one child walking and another soon to crawl, there was a constant danger of burns should little fingers touch the open room heaters. Now, the children can go anywhere they please about the house and we relax, knowing they won't touch fire or hot metal.

A year ago, the oldest boy pushed a stool too close to one of our room heaters. The insurance company paid for repairing fire damage, but that didn't set our minds at rest. What if the fire had spread before we detected it? The entire apartment building could have gone up in flames. Such a mishap is impossible with warm air heat.

Cleanliness. No matter what you do, a room heater is going to throw some dirt on the wallpaper behind it. Keeping walls and nearby woodwork clean was a continuing

Wallpaper stays fresh and clean above the modern register. Filters make the difference.

More heat for the house is obtained by merely moving the thermostat dial. Warm up is rapid.

housekeeping problem during cold weather.

But with an expertly installed gas fired warm air heating system plus clean filters when needed, the walls above warm air registers stay as clean as the day fresh wallpaper was applied.

No cold corners. We'd sit huddled close to a roaring room heater in our old apartment, and the walls 10 ft away would be like cakes of ice on especially cold days.

But now children play in the corners and any corner of a room is as warm as the area in front of the register.

Furthermore, there is no problem of hot ceilings and cold floors. The unit is located in the basement and two registers discharge into that downstairs area. Result: A warm, cozy place for kids to play on cold, wet days, plus warm floors in the house above, heated by basement air.

Fast heat. Sometimes it took until noon for the room heaters to make our apartment really comfortable. Today, all I have to do is inch up the thermostat and in approximately 15 minutes the entire house is heated to the comfortable 73 degrees we like.

I recall a day several years ago when we returned from an out of town trip. Our apartment had not been heated for four days. It was like the inside of an electric refrigerator—and it stayed that way for nearly nine hours after the room heaters had been turned on.

Even warmth throughout the night means the baby can kick off her covers and we don't have to be concerned.

Last month, warm air took only 20 minutes to heat a house which had been chilling for two freezing days we were away.

No stuffiness. Leave even the best of space heaters on for an entire waking day, we long ago discovered, and our apartment became close and uncomfortable. The only antidote was the old-fashioned kettle put to boil on the kitchen range. Otherwise, the air quickly dehydrated.

EDITORIAL POLL

You Are Invited

to express your opinion on the editorial articles in this issue. Each month we receive from readers letters on articles that have been particularly helpful. To encourage a wide range of opinion we are printing this form which you can conveniently clip and mail. *You be the editor!*

Which article would you have selected?
Which would you have refused?
Article or author .....
Comments .....

Mail to: American Artisan, 6 N. Michigan, Chicago 2, Ill.

Perimeter Heating In Two-Apartment Building

ROGERS FOLLANSBEE

President, Mechanical Home Systems, Inc.

IN JUST A FEW SHORT YEARS, perimeter heating has risen from obscurity to become accepted as the best method of heating basementless houses. Its acceptance has been so sudden that we are apt to forget why it is so successful. The reason of course is that a perimeter system supplies heat where most of the heat loss occurs.

For Basement Construction

It is even more applicable to houses with basements. Since the heat loss of the furnace and ductwork in a basement eliminates consideration of the floor as a source of heat loss, the relative importance of losses at outside walls, windows, and doors is increased. The major losses occur at the perimeter of the structure.

Another point in favor of perimeter heating that is not fully appreciated is that it always effects simplification of the ductwork. By preventing the formation of cold air within a structure, the problem of an elaborate cold air collection system is eliminated and the use of a single point, central return is made possible.

The advantage of this simplification is apparent in a two-apartment building where individual furnaces for each apartment are located in a common basement. The ceiling must accommodate the ductwork for two systems. Fig. 1 shows a conventional installation in a structure of this type. The ductwork may be compared with the simplicity of the perimeter system shown in Fig. 2.

Most of the simplification arises from the single point, central return air; yet heat is supplied at the point where it is lost.

Pioneer User

Edwin A. Chase, Lombard, Ill., a prominent home builder in the western suburbs of Chicago, is a pioneer in the use of perimeter heating for basementless concrete slab construction. M. L. DeWulf, heating contractor of

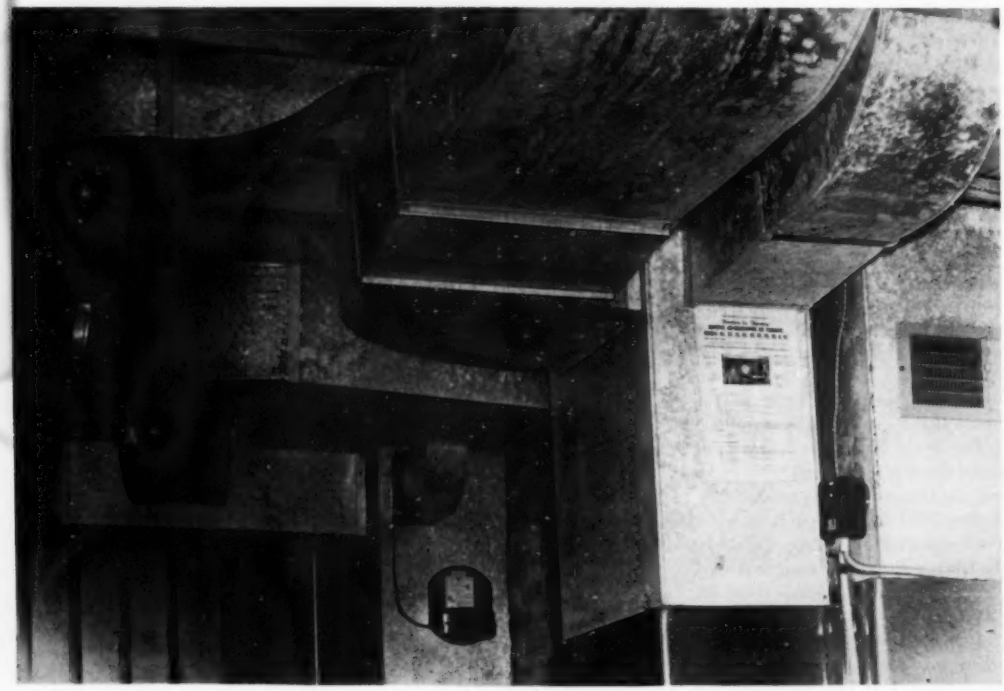
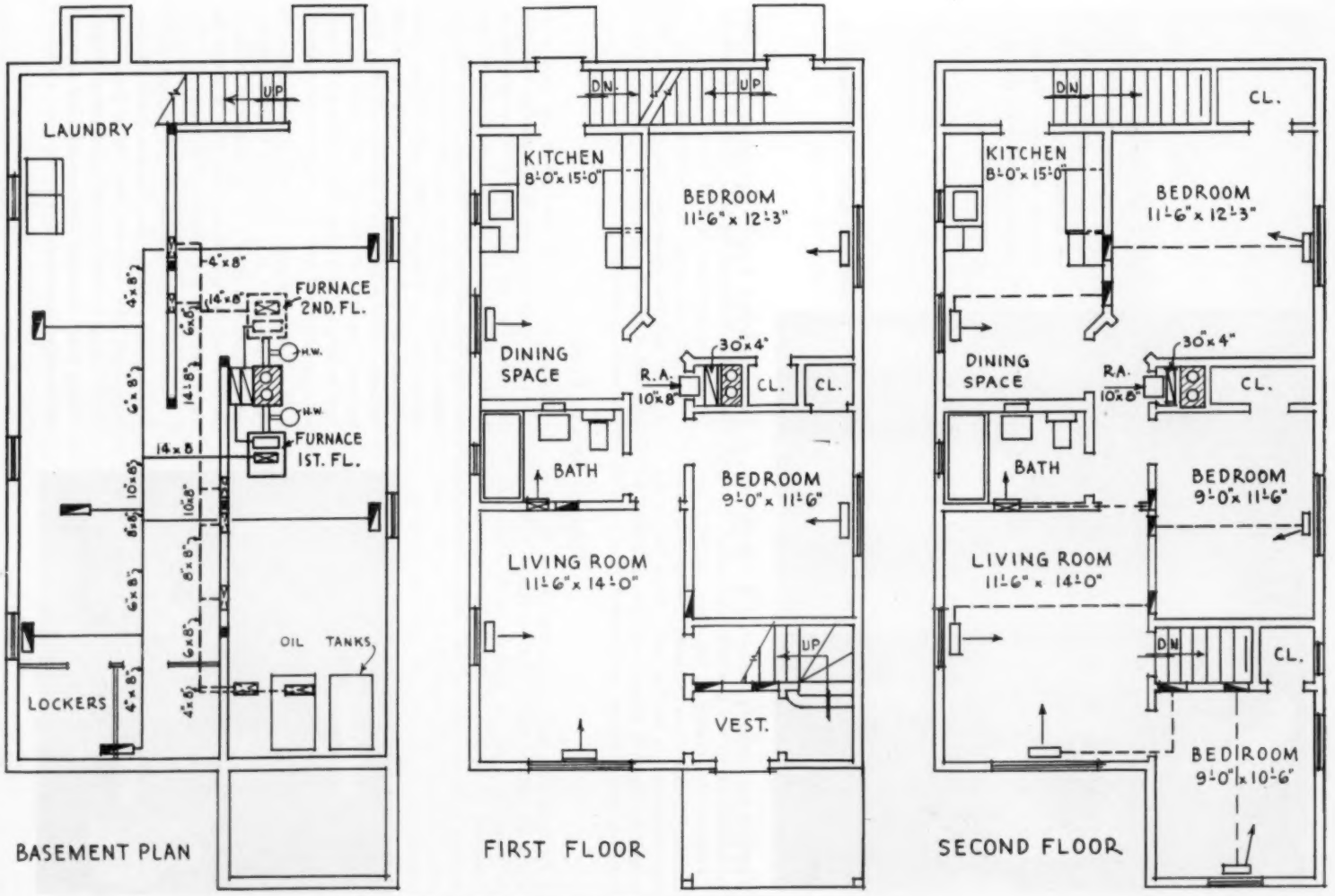


Fig. 1 Conventional system.


LAUNDRY
UP
4"x8"
FURNACE 2ND. FL.
14"x8"
H.W.
H.W.
FURNACE 1ST. FL.
14x8
OIL TANKS
LOCKERS
BASEMENT PLAN
DN.
UP
KITCHEN 8'-0"x 15'-0"
BEDROOM 11'-6" x 12'-3"
DINING SPACE
30"x4"
R.A. 10"x8"
CL.
CL.
BATH
BEDROOM 9'-0" x 11'-6"
LIVING ROOM 11'-6" x 14'-0"
UP
VEST.
FIRST FLOOR
DN.
CL.
KITCHEN 8'-0"x 15'-0"
BEDROOM 11'-6" x 12'-3"
DINING SPACE
30"x4"
RA. 10"x8"
CL.
BATH
BEDROOM 9'-0"x 11'-6"
LIVING ROOM 11'-6" x 14'-0"
DN.
CL.
BEDROOM 9'-0"x 10'-6"
SECOND FLOOR

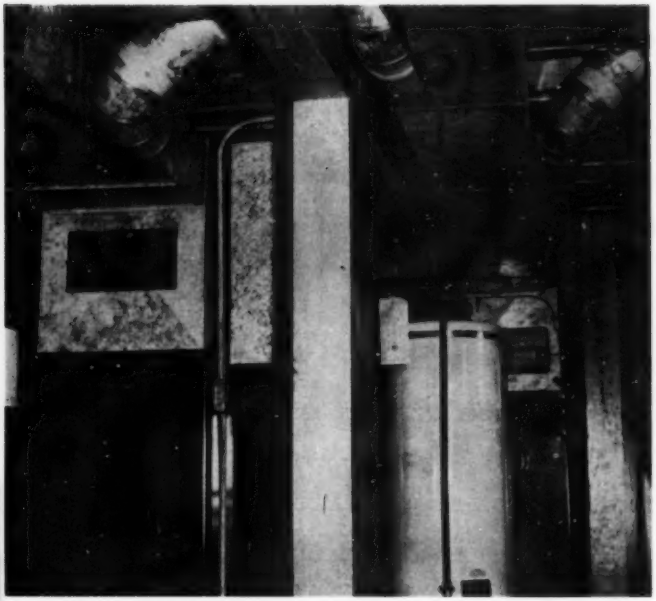


Fig. 2 This view of one of the apartments shows how neat the basement looks when the perimeter system is used. This simplification of ductwork not only improves appearance but also cuts installation costs.

Roselle, Ill., has installed for Mr. Chase perimeter systems in several homes of this type with fine results.

Following this experience, Mr. Chase started a construction program of two-apartment buildings, using conventional heating in the first unit. When he saw the complicated ductwork inherent with this application, he tentatively decided that the solution would be to install a hot water system. Fortunately, warm air heating demonstrated its flexibility by the simplified ductwork of perimeter system shown in floor plans, Page 47.

The perimeter system was installed quicker, at less cost, and with less interference with other trades. Most important of all, *Indoor Comfort* is provided in all rooms with warm air heating.

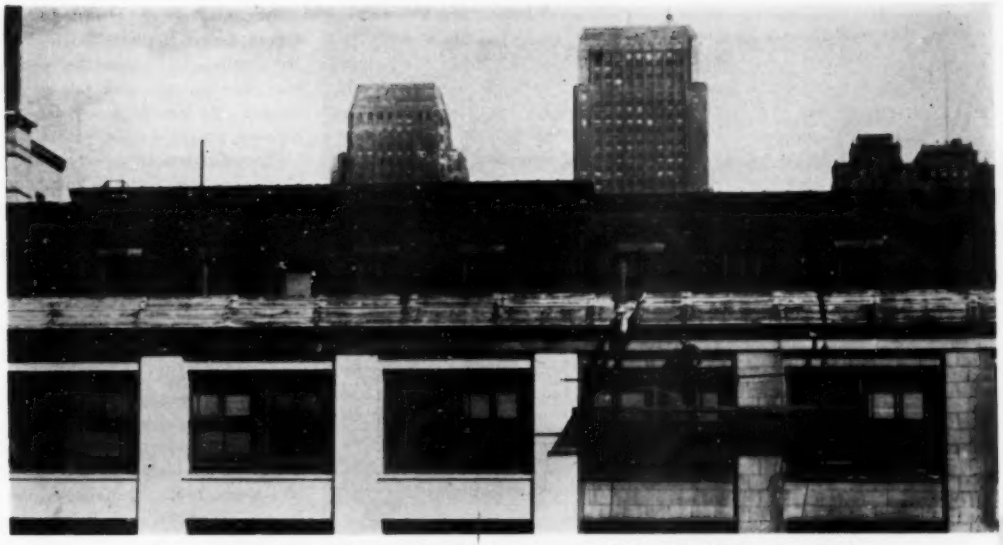
Furnace Blower Code

A PROPOSED CODE and standardized method for determining the pressure characteristics of furnace blowers is the project to which the members of the Engineering Committee of the Furnace Blower Manufacturers' Association are devoting their efforts. When published, the new code will proved a standardized method for furnace manufacturers to test and rate forced air furnaces.

The original work on this subject was done at the University of Illinois under the sponsorship of the association. The new code will, in all probability, be based on the University of Illinois test reported in Bulletin No. 76 under the title, Proposed Arrangement and Method for Determining Pressure Characteristics of a Blower Used in a Furnace. The original report is very comprehensive, and the committee's job is to simplify and make additions based on experience and study since that time. In this work, they have the assistance of Norman Buckley, of the Timken Silent Automatic Division, who was associated with the original work at Illinois.

According to committee members, in its final form the code will follow the form prescribed by the Commodity Standards Division of the U. S. Department of Commerce in the event that the industry may wish to submit the committee's work as a Commercial Standard.

In attendance at the meeting were, left to right: Joseph Brainard, Air Controls, Inc.; Norman Busch, Air Controls, Inc.; John Burrowes, Lau Blower Co.; George Gould, Viking Air Conditioning Corp.; Norman Buckley, Timken Silent Automatic Division and Ward Brundage, the Brundage Manufacturing Co.



These men are risking their lives when they go over the cornice of the building to the scaffold.

Dangers In Working At Dizzy Heights

DR. W. SCHWEISHEIMER
Rye, N. Y.

ARCHITECTS have specified sheet metal in place of wood trim for buildings for some time now. When the New York Municipal building was built in 1908-14, one of the most complete and handsome in the world, it made history because it was fireproof throughout, with all trim of sheet metal.

Still higher skyscrapers and bolder bridges meanwhile have shown how intimately sheet metal work is connected with building construction for roofing, skylights, cornices, etc. Actually America began the use of roofing tin, coming from Europe, more than 100 years ago. America's foremost residence, the White House, is roofed with tin. It was recognized that a good metal covering on a roof is as important as a good foundation. Where formerly wrought iron or wood was used for construction of skylights, today in all the large cities they are being made of galvanized sheet steel and copper.

Not Every Man Can Work at Those Heights

The workers who have to install sheet metal high up in the clouds, are bound to have special features both physically and mentally. One of the most difficult jobs in flat-seam roofing is that of covering a conical tower. Besides the technical know-how there is the need of knowing how to stand safely and undisturbed at dizzy heights,—1250 ft high above the avenue as on New York's Empire State building, or 600 ft above the river as on George Washington bridge.

Wearing safety belts is good and necessary, but their use alone doesn't make the specialist for work in those heights. Not every sheet metal worker, not every building worker is able to work at such heights though he may accomplish excellent work on the ground. Rufus Jarman has described recently how hard it was to choose the repair crew for the George Washington bridge from approximately 700 new men who applied for the job. Altogether some 60 men had to be chosen.

Only about 400 of the original 700 passed the medical and psychological tests! But not more than 30 were able to scramble about the framework to the bridge with sufficient nonchalance to qualify. The scaffold was swaying in a stiff breeze. A man who had helped build New York skyscrapers could not stand the work on the bridge. The absence of a solid wall was irritating to him, he said.

The climb is routine to most crew

members. It is a little rugged, a 29 year old worker said, but the height doesn't bother him. Sometimes he looks down, but it doesn't make any impression.

No George Washington bridge workers have been killed, but a number had narrow escapes. Safety measures there, Mr. Jarman pointed out, include nets and belts wherever possible, constant observation by foremen, and a ban on smoking to prevent lead poisoning from entering the body through the worker's lips. A new worker is accompanied by two old hands who observe his reactions and bring him down safely if he gets in trouble. If he freezes on a high ladder, his escorts will fasten a rope about him. Sometimes though they have to put their arms around him to steady his nerves.

There are eight men in each cage. "You're on your own up there", said a 50 year old worker. "When I first started in this business 30 years ago I never thought about the danger while I was working. But at night I used to sit and think about it and tell myself I'd quit. But I'd be back to work next day."

Another worker said: "Sometimes I watch the ships and the traffic and the people going on picnics. On a windy day in the cage it's just like in a rowboat. If you are not a good sailor you get seasick."

Seasickness and Dizziness

This kind of seasickness or dizzy spell while working on high bridges or skyscrapers or other high buildings may cause dangerous accidents. A sheet metal worker was working on a roof. He seemed to be an expert worker. Suddenly we see him looking around, he staggers, he grasps the chimney, he is standing quietly, and after a few minutes we see him going on with his job.

Nothing has happened, fortunately.

Nothing has happened, so it seems. But the man on the roof has had an attack of dizziness, short but unmistakable. He better pay attention to the warning sign of his somewhat overstrained body. A slight attack of dizziness which passes quickly, means danger in those heights. If the dizziness is severe the worker may lose balance and fall to the ground. At least he has to lean on the wall, provided there is a wall.

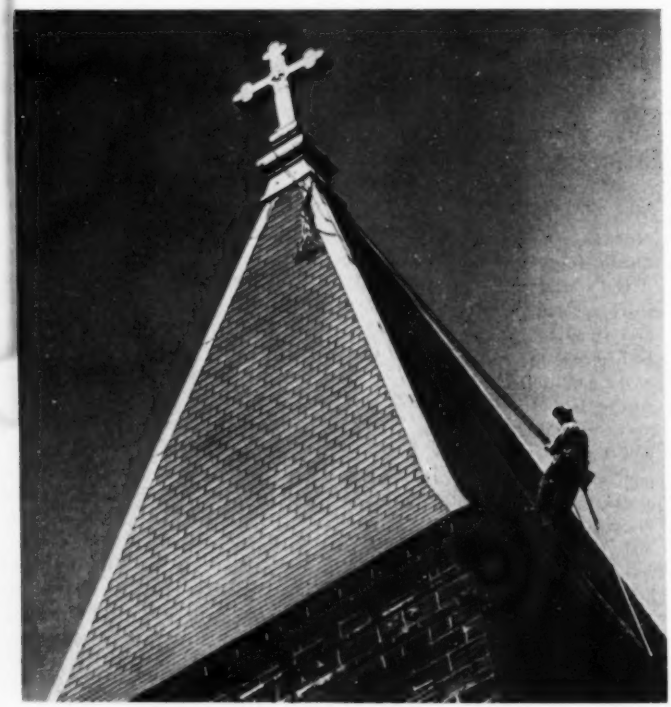
Often dizziness is caused by severe physical or mental strain, long hours of work or insufficient sleep. In a true attack of dizziness there is a sensation as if objects were rotating round the body, or the man feels that he himself is turning. There is also a temporary loss of the sense of equilibrium which causes the man to stumble or fall. Sometimes dizziness is accompanied by a feeling of nausea which makes the man vomit.

A sheet metal worker had worked through a few nights on the covering of a tower, partly in darkness, partly with aid of artificial illumination. He wanted to finish the work as rapidly as possible. The third day while still busy on the risky work, he felt dizzy and had to step down. Two good nights' rest cured him completely.

Other causes of dizziness are too much smoking or other excess, general weakness after sickness, or anemia, thin blood. Dizzy spells after an attack of flu are nothing unusual.

Many cases of dizziness are produced by lazy bowels; chronic constipation may poison the blood and the brain. A roofer whom I know, told me an interesting observation. He felt dizzy every morning after getting up before his bowels had moved, and he would not dare to work on a roof or scaffold at that particular time. However, after his bowels had moved, all signs of dizziness disappeared, they did not reappear during the whole day, and he felt like doing a better job.

Attacks of dizzy spells particularly in elderly sheet metal workers are a hint to make a careful examination of their heart and blood vessels. Dizziness frequently is one of the first signs of disorders connected with high blood pressure. Ear troubles too are frequently connected with vertigo (dizziness).



This rigging must be expertly hung for safety.

Loss of Balance

There is also a kind of nervous dizziness without any change in the condition of the organs. Most troubles of that kind disappear quickly under proper treatment. As long as he is troubled by repeated dizzy spells, no sheet metal worker or building worker should work all alone on a ladder or scaffold.

Sometimes sheet metal workers who are nearsighted or farsighted, find themselves without their glasses to which they are accustomed and on which they depend in their work. They estimate incorrectly the distance they have to cope with on their tower or scaffold, they have a blurring of vision. Proper glasses, well adjusted, are an indispensable factor of safety in those dizzy heights.

The careless use of scaffolds, ladders, stepstools etc., or the use of defective ones may result in disastrous falls, as we see from a recent report of the Metropolitan Life Insurance Co. Loss of balance while standing and working on the ladder etc. was the most frequent cause of falls. Most of the victims who lost their balance and fell were overreaching with arms stretched over their heads and far to one side.

Accident Figures

Accidents of this type often occur because ladders are placed too far away from the point to be reached, or too close to it. Or the ladders may be too short for the purpose. The high figures for accidents in the building trades (171 per cent of the average for builders and building contractors; 137 per cent for brick and stone masons; 217 per cent for roofers) are in part connected with such procedures.

You will find comparatively high accident figures for most construction workers who have to use sheet metal. It starts with coppersmiths and tinsmiths who have an accident figure of 118 (compared with 100 in all occupations and trades). Blacksmiths have an accident figure of 138 per cent, and structural iron and sheet metal workers as high as 271 per cent! Falls were responsible for a large percentage of the accidental deaths. They accounted for more than three-fifths of the accidental deaths among roofers and slaters, nearly a half among structural-iron and sheet metal workers, and almost two-fifths among brick and stone masons.

The lines on this bosun's chair are married to prevent the chair from falling.

Laverack and Haines, managers of the compensation insurance group for the New York State sheet metal contractor's association, have supplied some figures on accident incidence. In the fiscal year ending in 1950, 52 accidents due to falls were reported. These falls accounted for 30.3 per cent of the compensation paid out by the group. The cost per accident for falls from ladders and scaffolds was $1,301.00.

The members of the building trades, including roofers, structural iron and sheet metal workers, etc. are bound to work on exposed places, on scaffolds, ladders and horses. Better care for life and safety can be procured from two directions: from the equipment and from the working man himself.

Greater Care on Tall Buildings

Comparative statistical figures of the building trades were compared with other industrial activities. There was evidence that accidents caused by ladders and scaffolds in the building trades are about 2½ times as frequent as in the average of all occupations. Statistical experience has shown that scaffold accidents are particularly dangerous and costly for both worker and employer.

Statistical figures in New York City showed that ladders and scaffolds together caused more than 51 per cent, more than half of the accidents. Either the equipment was defective or the men were working so rapidly that accidents were due to this hurried working. The taller the building, the greater the care used on the equipment on the average. It seems that there is more negligence on low-ceiling buildings. The difference is psychologically founded; it comes from the natural knowledge that slight stumbling on a skyscraper is fatal while a fall from a three-story may mean only a sprained ankle.

Safety measures are decidedly more reliable today than they were in former times.

How To Figure Infiltration

Frederick B. Morse, P. E.*

The author presents an interesting discussion of a subject that causes controversy whenever heating men get into the topic of heat loss calculations.

INFILTRATION IS always mentioned in the first breath whenever engineers begin a discussion of heat loss. Heating engineers have different ideas on how to figure infiltration. Most of them use either the air change method or the crack method. Unfortunately too few of them make use of a third method, which, if correctly applied, can save them money and provide their customers more comfort.

Air Change Method

George Smith takes care of infiltration by using the air change method. This is a rule of thumb that gives him the number of air changes to use for each room in a house according to how many sides of the room have outside walls. If a room has a volume of 1,670 cu ft and has two outside walls then, according to the rule of thumb, infiltration into the room would be equivalent to 1½ air changes, or 1½ room volumes per hour. Now for a temperature difference of 80 F (−10 F to 70 F), the amount of heat this represents is computed as follows:

$$H = N \times V \times C \times TD$$
$$= 1.5 \times 1670 \times 0.018 \times 80$$
$$= 3600 \text{ Btu/hr}$$

where

H = Sensible heat, Btu/hr
N = Number of air changes per hour
V = Volume of room being considered, cu ft
C = Specific heat, Btu per cu ft per F temperature difference
TD = Design temperature difference, F

Smith dumps 3,600 Btu per hour into the room over and above that lost by transmission through the walls, glass, and other surfaces. This procedure may provide fair results but we should not call it engineering as there is no direct relation between the number of outside walls of a room, the volume of the room, and the infiltration of air.

Crack Method

Laboratory tests have determined the amount of inward leakage for various styles and sizes of sash, variations in fit, and different wind velocities.*

Bill Jones uses these data in the crack method to figure the amount of air that will leak into each room. Just as an example, suppose Jones has a room with 74 lineal ft of crack and the tabular data give an inward leakage of 39 cfh for each lineal ft of crack. Then for an 80 F design temperature difference Jones computes heat loss by infiltration in the following manner:

$$H = L \times CL \times C \times TD$$
$$= 74 \times 39 \times 0.018 \times 80$$
$$= 4{,}160 \text{ Btu/hr}$$

where

H = Sen-ible heat, Btu/hr
L = Total length of crack in room, ft
CL = Crack leakage, cfh for each lin ft of crack
C = Specific heat, Btu per cu ft per F temperature difference
TD = Design temperature difference, F

Jones now sizes his supply system to deliver 4,200 Btu per hour to the room over and above heat lost by transmission through walls, glass, and other surfaces.

Comparison of Air Change and Crack Methods

Let us take a look at what Smith and Jones have done to the same room. See south bedroom of Fig. 1. They disagree on how to figure the effect of infiltration of cold air into the room. Once they evaluate the infiltration, however, they agree to add that quantity of heat

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*ASHVE *Guide*, American Society of Heating and Ventilating Engineers, Vol. 29, 1951, page 216

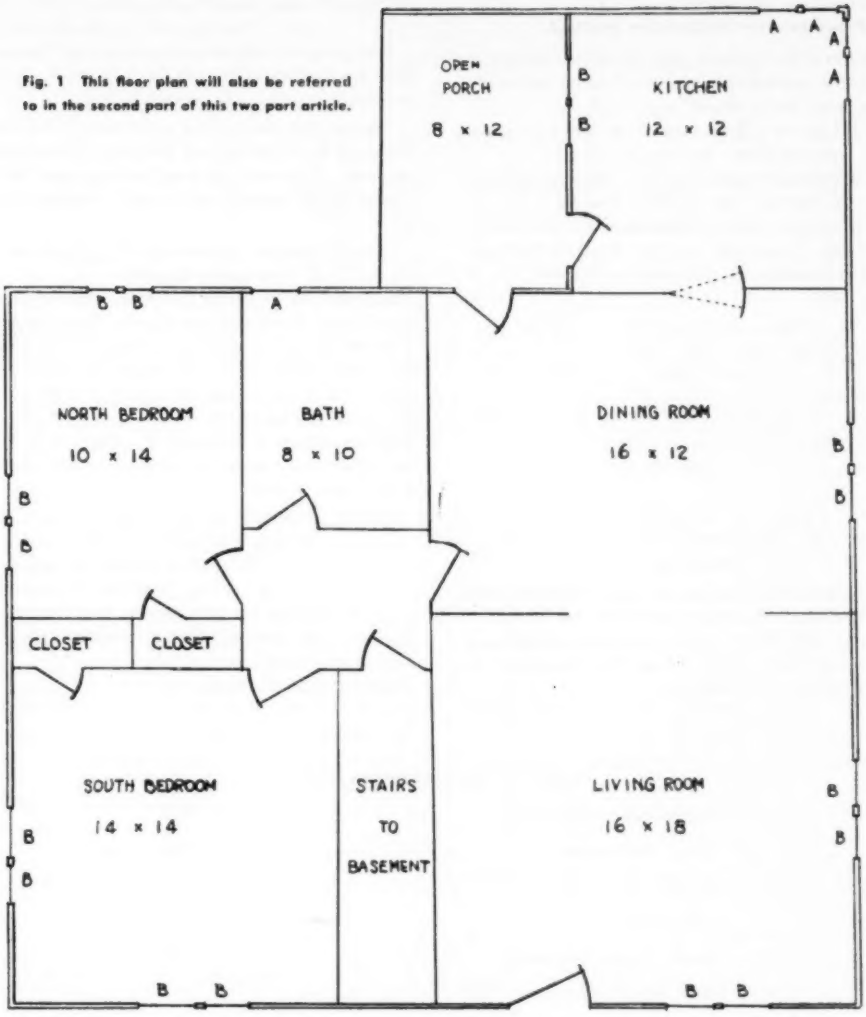


Fig. 1 This floor plan will also be referred to in the second part of this two part article.

to the room *in addition to transmission heat losses.*

Many heating engineers agree with Smith and use the air change method regardless of what kind of a heating system will go into the house.

Many heating engineers side with Jones and the crack method, although they argue that only *one-half* the crack should be figured for some rooms and *all* the crack for other rooms. But whatever they end up with becomes extra heat supplied to the room!

Let us look at it another way. Smith & Jones are saying that if 5,000 Btu per hr will be required to heat the crack leakage from outside design conditions to room temperature, then this 5,000 Btu per hr is supplied to the room. So outside air leaks in window and door cracks and swishes across the floor until the extra 5,000 Btu can warm it to room temperature. This results in floor drafts and makes it decidedly uncomfortable to sit near a window or an outside door.

Would it be better if no cold air came in any of the cracks? Every homeowner can see there would not be any cold air swirling around his ankles, consequently, his comfort will rise a notch or two.

There are other savings too. The duct supplying warm air can be smaller since it need not carry the extra 5,000 Btu per hr to offset crack leakage. Of course the return duct will also handle less air. For an average house the smaller ductwork saves many pounds of sheet metal and considerable labor for the installer. Such a system will actually work if the cracks leak air out instead of letting cold air infiltrate. A system of this kind is said

to be designed by the exfiltration method.

Design Procedure for Exfiltration Method

To illustrate the essential features of the exfiltration method for a mechanical warm air heating system the following steps are outlined:

Step 1 Lay out a floor plan of the house to a convenient scale. See Fig. 1.

Step 2 Record window sizes and other general information. See Tables 1 and 2.

Step 3 Compute heat transmission for each room. As an example, consider the south bedroom. The heat transmission is calculated as follows:

Windows

H = Area x U x TD
= (13.8) (4) x 1.13 x 80
= *4,970 Btu/hr*

Outside Walls

H = Area x U x TD
= (28) (8 ½) x 0.25 x 80
= *3,660 Btu/hr*

Ceiling

H = Area x U x TD
= (14) (14) x 0.06 x 73
= *860 Btu/hr*

Total heat transmission for the south bedroom is the sum of the above three items or 9,490 Btu per hr.

The same method was used to compute transmission loss for other rooms in the house; the results are recorded in column 2 of Table 3.

Step 4 Locate supply grilles, return grilles, and furnace. Then lay out the distribution system.

It is presumed that the reader is already familiar with these components of a mechanical warm air system so, for simplicity, they are omitted in Fig. 1.

Assume that the furnace is located in the southeast corner of the basement and that high sidewall registers are used. Now scale the length of run from the bonnet to each supply register and record in column 3 of Table 3.

Step 5 Estimate temperature drop from the bonnet to each supply register.

Experimental work has shown that exposed duct work loses about 1 F for each 4 ft of run. Thus the run of 41 ft to the kitchen would have a drop of temperature of 41 ÷ 4, or about 10 F. Assuming the bonnet temperature is 130 F, air leaving the bonnet at 130 F would arrive at the kitchen register at 120 F (130 — 10 = 120). This temperature is recorded in column 4 of Table 3; the register temperature for the other rooms is calculated in the same manner.

Step 6 Determine the air supply for each register. Air enters the kitchen at 120 F and leaves at 65 F. We must determine the amount of air that, in cooling from 120 F to 65 F, will release the transmission heat loss of 12,150 Btu per hr. This is computed from the following equation:

AS = H x cfm factor

Table 1 General Information

Outside wall construction	U = 0.25
Ceiling construction	U = 0.06
Windows and doors	U = 1.13
Ceiling height	8½ ft
Outside design temperature	— 10 F
Inside design temperature	70 F
Attic design temperature	— 3 F
Window crack leakage	39 cfh per lin ft crack
Door crack leakage	110 cfh per lin ft crack

Table 2 Window and Door Schedule

Opening	Size in ft	Area Sq ft	Crack Length ft
Window — A*	2 x 3½	7.0	13.0
Window — B*	2½ x 5½	13.8	18.5
Door	3 x 7	21.0	20

*Double-hung wood sash

Table 3 Supply and Return Air Quantities for Exfiltration Method

1	2	3	4	5	6	7	8	9	10	11	
	Heat	Run	Regis.	cfm		cfm	Crack leakage			Return	
Room	loss	ft	temp	factor	cfm	@ 65	Lin ft	cfh	cfm	air	cfm
Kit.	12,150	41	120	0.0185	225	204	89/20	5671	95	109	Vent
DR	6,720	41	120	0.0185	125	113	37/20	3645	61	52	
LR	12,400	25	124	0.0173	215	193	74/20	5090	85	108	
S-BR	9,490	25	124	0.0173	163	147	74	2890	49	98	
N-BR	8,570	51	117	0.0194	166	150	74	2890	49	101	
Bath	2,390	43	119	0.0188	45	41	13	508	9	32	Vent
Total	51,730				939	848			348	359	

where

AS = Air supply, cfm

H = Heat loss, Btu/hr

To determine the cfm factor find the register temperature along the bottom of Fig. 2. Follow this temperature vertically to the curve. Then trace a horizontal line to the left; read cfm factor on the left scale. The cfm factors for all rooms are recorded in column 5 of Table 3. The cfm factor is then multiplied by the transmission heat loss to find the air supply for the room in cfm. Thus,

Col 2 x Col 5 = Col 6

For the kitchen,

$$AS = 12{,}150 \times 0.0185$$
$$= 225 \text{ cfm}$$

(Please turn to page 152)

Temperature	*cfm factor*
100	0.0380
105	0.0217
110	0.0222
115	0.02010
120	0.01845
125	0.01706
130	0.01580
135	0.01481
140	0.01395
145	0.01317
150	0.01250
155	0.01192
160	0.01137
165	0.01090
170	0.01047
175	0.01005
180	0.00968

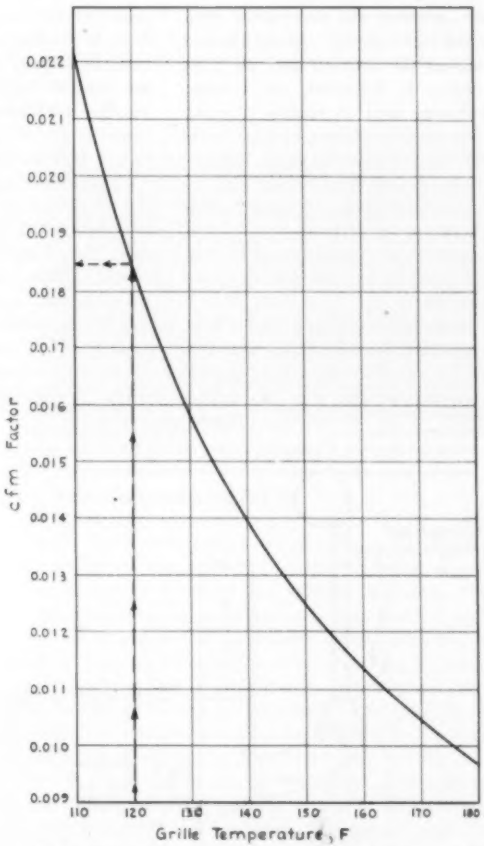


Fig.2 Determining cfm factor from grille temperature

Booster For Suction Hoods

HOWARD M. NICHOLS*

THE slope of the sides of a suction hood, or hopper, that funnels wool and similar materials into an air conveying system, should be quite steep. Unless the slope is steep, there is a tendency for material to lodge in the extreme ends of the hood and slowly pile up until finally the hood is clogged and the system rendered inoperative.

With a shallow hood, or feed hopper, material will not readily slide to the pipe opening. As the distance between the material and the pipe opening is increased, air velocity decreases until it reaches a point where it is insufficient to draw material into the conveyor pipe. For example, at a distance of one pipe diameter from an open end pipe having a velocity of 4000 fpm at its entrance, the air velocity would be only 325 fpm; much too low to move material.

While the hood sides would have a tendency to confine air flow and thus produce a somewhat higher velocity than an open pipe, the general effect would be the same. This rapid dissipation of air velocity at a suction opening can be easily demonstrated by placing a small pipe of material on the floor and slowly approaching it with a vacuum cleaner nozzle. It is surprising how close to the material it is necessary to get before the air velocity is sufficient to pick it up.

Materials such as cotton or wool conveyed by fan systems require a hood or feed hopper with sides that make an angle of at least 60 deg with the vertical center-line. Under favorable conditions hoods having a slope as flat as 50 deg have been known to work satisfactorily.

It sometimes happens that the required spread of the suction hood and the limited distance above floor level is such that it is impossible to obtain sufficient slope to the sides of the hood and trouble develops with the pick-up. This condition is prevalent with air conveyors that take wool from discharge aprons of driers. Here, width is considerable and distance above the floor is limited.

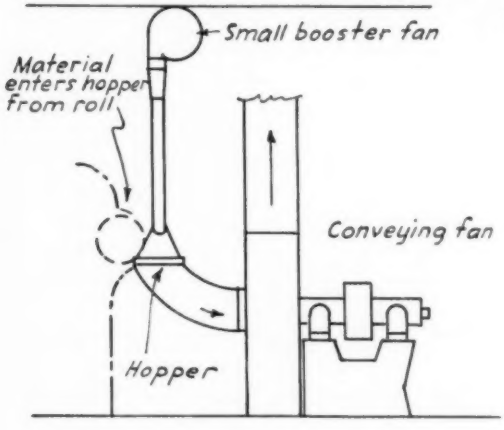
This difficulty can be overcome by supplying a small blast of air at the ends of the hopper as illustrated in the accompanying sketch. A small booster fan is used to provide an air blast to direct the flow of material to the hopper center. Air blast is much more effective and persistent than air suction. This can be readily demonstrated by reversing the vacuum cleaner experiment and blowing an air stream against the pile of material.

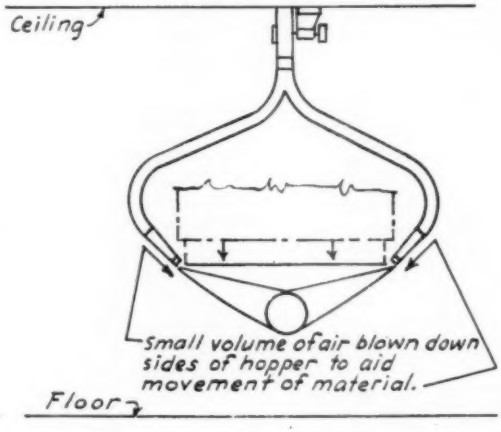
The booster fan can be a small centrifugal pressure fan having about 7 to 8 in. diameter outlet and feeding two 4 in. branch pipes which are tapered down to flat nozzles directed into the suction hood as indicated.

The fan should deliver about 600 cfm at 5 w.g. This would require a one horsepower capacity motor.

Another solution of this problem, where compressed air is available is to provide compressed air jets in place of blower nozzles. However, this method is considerably more costly from an operating standpoint.

*Sturtevant Division, Westinghouse Electric Corp. Hyde Park, Mass.





Value Of Furnace Trade-In Goes To Charity

LESLIE T. BRUHNKE
Wauwatosa, Wis.

INSTEAD of pocketing money received from the junk man for old furnaces, Anderson Furnace Co. of West Allis, Wis. turns it over to any charity the customer designates. There isn't any doubt that Anderson could use this policy to help close a sale but they do not publicize it. Unless the customer has been told by previous purchasers, he doesn't know about it until the junk is being removed from the basement. The customer gets a feeling of satisfaction in doing a good deed and the policy also allays any suspicion that unusual profit is being made from the sale of old equipment.

In addition to refusing to promote sales on this basis, they also insist that it be a legitimate charity. One customer wanted the money to go to his Legion Post for a beer party but the Andersons insisted that it be for a recognized charity and the money in question was finally donated to the polio fund. A woman customer talked them into giving it to her because she was a widow having a hard time. Later they found out that she owned several rented houses and since then the money is never given to the customer.

They have not kept track of the amount donated. When a check is received from the junk dealer, they endorse it to the charity named by the customer. The only rule is that it must be a bona fide charity approved by the Better Business Bureau. They have a file of letters received from about 50 organizations thanking and commending their efforts but they would not permit photographing it. The amount is not entered on the company books although it amounts to several hundred dollars a year. Churches, homes for the aged, orphanages, polio fund, heart fund, and so on have been the recipients. While none of this information is used to get business, they do get a lot of good word of mouth publicity in spite of their efforts to do it as a Christian gesture. They have also been written up in a religious publication.

Although Ivan Anderson has been doing sheet metal work since his apprentice days in Sweden, it wasn't until 1944 that the present business was incorporated with son, Laurel as president, Ivan as vice president, Harold (son) as treasurer and Mrs. Ivan Anderson as secretary and Leonard (son) as vice president in charge of sales. They started the business in their home and three years ago put up the present building on Greenfield Avenue. Mrs. Anderson does office work and takes care of the showroom while the father, four sons and two sons-in-law do all the sales, erecting and sheet metal work. It is strictly a family concern with all members being able to do the other fellow's job.

Laurel Anderson learned the electrical trade and was a supervisor at a large motor company. Harold was a tool maker and Evan a machinist for the same concern. Leonard Anderson studied architecture and although he never practiced, his knowledge is useful when bidding on sheet metal and furnace work for new homes.

Harold and Laurel are radio hams and can broadcast and receive from their homes and cars. This ability might be handy for dispatching service work but they both live up to the government rules of not using their equipment for anything commercial.

Anderson Furnace is equipped to do any kind of a sheet metal job for homes, but they do not do any commercial work. They manufacture all of their own gutters and fittings. Their gutter is a special Anderson gutter which is a combination of the ogee and K types. They do not have an inside horizontal edge to rust. Having something which cannot be obtained everywhere is good merchandising.

The Anderson building in West Allis.

While they do not try to get business on the basis of their charity efforts, they do advertise in the telephone book, in the local *West Allis Star* and also do some advertising in fraternal and religious bulletins. They are presently listed in 12 places in the classified section of the telephone book and have contracted to be listed in 23 places in the new directory. According to Leonard, about 90 per cent of their business comes from referrals by satisfied customers. By being listed under 23 divisions, the prospect will not have any trouble in finding them when he looks in the phone book. As they are in the A section of all ads, the Andersons feel that large classified ads are not necessary — the largest ad being a column width about one and a half inches long.

Anderson gives 24 hour service but they do not have any service contracts except for the year of free service

on new equipment. According to Harold Anderson, 80 per cent of the service calls are on units installed by others. They have very few calls on Anderson installations.

Besides the 4 by 8 in. ad which is regularly in the *West Allis Star*, they also have one in the classified section mentioning gutters, conductors, water heaters, furnaces, and oil burners. Thus if a reader is oblivious of the big ad, he may see the classified one.

At present Leonard Anderson is working out a co-op deal with the *Star* to furnish a subscription to the paper for every customer who purchases $20 or more a year. The cost will be about 2 cents per week per customer compared to about 6 cents if a weekly card is sent out. The total cost per year will be about $1,000. The customer will see the weekly messages in the paper instead of on a post card.

Before installing any heating equipment in a house they make a complete inspection to make sure the chimney is adequate, that there are enough return grilles and that the house has enough insulation for the size of the unit.

Slogan Helps Business

PICKING a clever, easily-remembered slogan, and adhering to it over the years, has proven excellent merchandising for Charles Kline, head of East Jefferson Heating Co., in Lakewood, Colorado.

Mr. Kline, with more than two decades of warm air heating and sheet metal work behind him, has found that while people are likely to forget names and addresses, a slogan will be fixed firmly in their minds. There are many examples of this, he indicated, in everyday life, pointing out that often slogans outlive the business firms who created them.

Therefore, when he opened his small, modern showroom on West Colfax avenue in this fast-growing Colorado city, Mr. Kline studied many catchy, easily-remembered slogans, before coming up with the final decision.

The ultimate choice was the slogan *Installers of Finer Heating Plants*. This simple statement, which is incorporated into billboards, newspaper advertising, the telephone directory ad, and on all letterheads, invoices, etc., has been responsible for stopping traffic profitably ever since it was first adopted, according to Mr. Kline.

Shown on this page is a view of the large billboard sign over the Colfax avenue showroom. The sign is painted in duplicate to be easily read in either direction, and has been responsible for stopping many particular homeowners, who are more interested in the ultimate quality and satisfaction of their heating plant than competitive costs, Mr. Kline has found. Dozens of heating plants have been installed each year, at minimum selling cost, merely because a homeowner who had first noted the slogan in newspaper advertising, recognized it later when driving past the heating company and drove into the spacious parking lot, to ask details.

The slogan is easy to see and remember.

On display in the showroom are three samples of typical heating plants as installed by East Jefferson, including ductwork and controls. Photographs of completed jobs are kept on file. Such details as unobtrusive joints and the use of aluminum where exposed ductwork must be considered are well emphasized. The net result has been a consistently profitable installation volume at a minimum promotional cost.

Home Show Display

ANTHONY MONTEFUSCO, proprietor of Montefusco Heating & Sheet Metal Service, 1519 South Adams St., Peoria, Ill., reports excellent results from a display at the annual Peoria Home Show recently. Items displayed included a XXth Century furnace, Delco gas Heating System, Delco gas burner, and Sonner gas burners.

A drawing was held in which some 300 cards were deposited, with a gas conversion burner as the prize.

Mr. Montefusco reports about 20 sales from the floor. Most of these were of gas burners but included one warm air furnace. In addition a fine list of prospects was secured on which to work during the ensuing months.

BUSINESS IN MOTION

To our Colleagues in American Business . . .

The fact that a Revere Distributor is now celebrating its 125th anniversary year is an indication of the service the company has given its customers through those years. It is also another proof of the essential function performed by distributors for American industry. Most goods, whether industrial materials such as copper and copper alloys, aluminum alloys, iron and steel, or consumer articles such as refrigerators, radio and television receivers, kitchen utensils and ranges, go through the hands of distributors. Generally speaking, only the large buyers are in a position to purchase direct from manufacturers, who do not find it economical to handle the smaller orders. Yet those orders when pooled in the hands of an organization set up to handle them attain sizable totals, and hence a good distributor account is exceedingly attractive to a large manufacturer such as Revere.

A distributor serves not only the factories from which he buys. He also performs an invaluable service to his customers by making quickly available to them the products they require. A machine shop, for example, may need only a few hundred pounds of brass rod; there is a distributor within easy reach who can furnish it almost immediately. Or a contractor may want a few pieces of steel pipe and a thousand feet or so of copper water tube. Again, the distributor has them. A metal products distributor has to carry such items and an infinite number of others. The Revere Distributor who started in business 125 years ago actually has in stock 53,000 different items, cataloged, indexed, and held in warehouses ready for immediate shipment throughout its territory. Each month this stock is drawn upon by 5,000 to 8,000 customers, each order relatively small. There are many Revere Distributors with similar stocks and offering equal service.

To keep this distributor's warehouses filled with a balanced inventory, 18 people are required in his purchasing staff, which includes specialists in various kinds of materials, machines, tools and supplies. And to serve customers with information, quotations and the like, 25 salesmen are on the go constantly, calling on manufacturers, contractors, builders and stores throughout the busy industrial area in which the distributor operates. The large business done by the company is in great contrast to that of 125 years ago, when it was little more than a hardware store. The enterprise has grown in the American tradition of freedom to prosper in accordance with the principles of reliability and efficiency, fair dealing and integrity in performing a desired function.

Revere Distributors are selected for their ability to serve, and also chosen as to location, so that no matter where you are in this big country of ours, there is a Revere Distributor within easy reach. Today metal stocks may be short due to defense demands but manufacturers are doing everything possible to keep distributors supplied.

If you buy from distributors we suggest you remember that they are not only "central stockrooms," but have a great deal of special knowledge about the products they sell and can give you much helpful advice. Not only that, through the Revere Distributors you can be put in touch with the Revere Technical Advisory Service, which will cooperate with you on matters concerning the selection and fabrication of the Revere Metals. Our distributors, and those of every other manufacturer, render many essential services, both to those to whom they sell, and to those from whom they buy. The distributor system as it operates in the United States arose in response to the need for it. Today it fulfills that need more effectively than ever before.

REVERE COPPER AND BRASS INCORPORATED

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Guard Working Capital Carefully

ARTHUR ROBERTS
Pompton Lakes, N. J.

Working capital is often referred to as seed money because it is the essential element in the growth of a successful business. It is important for the contractor to know how to handle his seed money to build a profitable enterprise.

DESPITE THE fact that money is relatively abundant today and that currency in circulation will increase rather than descrease in this war economy, the businessman must guard his working capital more carefully today than in times when money is less plentiful. That is because the dollar has decreased in value. Today you need about $2 to buy what $1 bought a decade ago, costs are increasing and taxes are a much heavier drain on seed money than they were before Pearl Harbor. Despite the fact that much has been written about working capital the subject seems vague to many *Indoor Comfort* dealers. This is because the calculation takes in a number of factors whose relationship is easier to explain by means of simple tables than words. For this reason, we show you how you can appraise your working capital position and what factors to watch in order to maintain a satisfactory working capital ratio for your business in the critical period ahead when it is vitally important that this be done. The figures and ratios are merely illustrative to bring in all the relevant factors and do not represent the recordings of any dealer or group of dealers.

TABLE 1

Assets		*Liabilities*	
Cash	$1,200	Accounts payable	$1,000
Receivables	1,800	Accrued liabilities	500
Inventory	1,500		
Current assets	$4,500	Current liabilities	$1,500
Working capital	3,000 (2)		
Current liabilities	$1,500 (1)		

The excess of current assets over current liabilities is working capital. When working capital is twice current liabilities, a business is assumed to have ample seed money unless receivables and inventory are slow to liquidate. In this case, working capital may have to be increased to as much as three times current liabilities. The ratio of current assets to current liabilities is known as current ratio. Bankers and creditmen place more reliance in current ratio than in surplus or net worth when they are considering applicants for credit. That is why the dealer should try to maintain a good current ratio at all times. If your current ratio is below 2 to 1 and you need a loan or substantial credit, don't be too surprised if you are turned down unless you can offer a satisfactory explanation for your weak financial condition.

TABLE 2

Assets		*Liabilities*	
Cash	$ 500	Accounts payable	$2,000
Receivables	1,000	Accrued liabilities	1,000
Inventory	4,500		
		Current liabilities	$3,000
Current assets	$6,000		
Working capital	3,000		
Current liabilities	$3,000		

The working capital in this case is the same as in Table 1, but the ratio of inventory to working capital is on the basis of 3 to 2 ($4,500 to $3,000.) In most cases, inventory is in good ratio when it runs at 50 per cent of current assets (in the foregoing table it is 75 per cent) or when stock on hand is about 70 per cent of working capital, (in this case, the inventory exceeds the working capital by 50 per cent). When a financial statement shows these ratios, the inventory turn will more than likely be too low, the capital invested in stock too high, resulting in excessive interest on inventory investment, excessive insurance expense on a stock overload, higher losses on inventory due to spoilage, damage, theft, etc.

Instant Steam

FROM A SIZZLING HOT PAN ...THE MOST EFFICIENT, MOST DEPENDABLE WAY TO PUT

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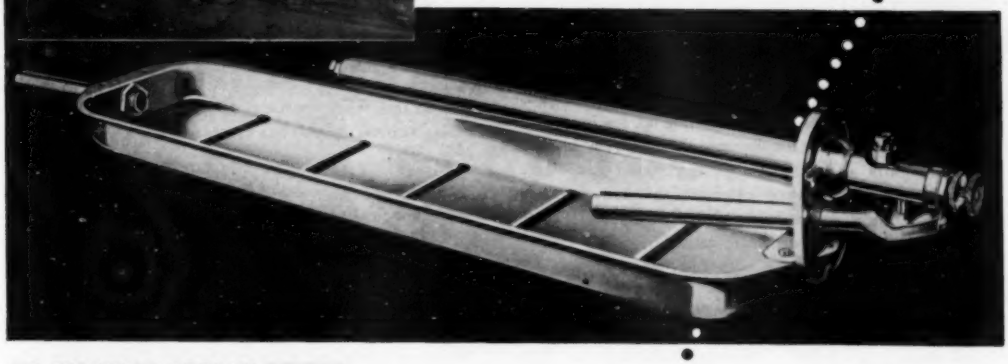

NO STAGNANT POOL TO REHEAT

Only a *thin film of water forms in pan.* Pan heats extremely fast. Water vapor is formed quickly—efficiently.

SUPER-SENSITIVE THERMOSTAT

Fool-proof. Gives *immediate response to temperature change.* Starts and stops flow of water according to bonnet temperature. Leaves only thin film of water in bottom of pan, when furnace heat goes down.

OUTSIDE SCREW ADJUSTER

Easily reached. Permits *fingertip control of water flow.* Lock nut assures hairline regulation.

EASY INSTALLATION

Pan rests directly on combustion dome for most efficient operation. Can be suspended in plenum chamber, if necessary.

ONE KIT TO PURCHASE

All accessories contained in one compact unit. Easily assembled—economical to use—quick to sell. With 12 pan sizes for any type warm air furnace.

THERMO-DRIP *Automatic* HUMIDIFIERS

With the AUTOMATIC HUMIDIFIER water drips into pan only after pan is hot. Each drop sizzles into steam as it strikes heated pan surface.

This puts the MOST MOISTURE into air stream when it is MOST NEEDED. That's why Thermo-Drip gives *faster — more efficient vaporization.* Write TODAY for FREE literature. Dept. A-101

AUTOMATIC HUMIDIFIER CO. Cedar Falls, Iowa

More space is needed to house an excessive inventory and more help to service it. All this extra outlay cuts profits and is a drain on working capital, making it necessary to increase it proportionately to maintain liquidity in your business. If this can't be done, the dealer will fail to meet his obligations on time and will lose profitable commercial discounts.

TABLE 3

Assets		*Liabilities*	
Cash	$1,125	Accounts payable	$1,000
(2) Receivables	2,250	Accrued liabilities	500
(1) Inventory	1,125		
		Current liabilities	$1,500
Current assets	$4,500		
Working capital	3,000		
Current liabilities	$1,500		

Same working capital as Table 1 and Table 2, but the receivables-to-inventory ratio is 2 to 1, indicating poor collection practices. When a balance sheet shows up in this fashion, either the dealer lets his customers pay as they please and does not dun them hard enough on the due dates or he is including a lot of bad accounts in his receivables. A banker would assume this if a dealer submitted this kind of a balance sheet when applying for a loan. He would ask for a breakdown of the receivables classified as to their past due dates. Where dealers are lax on credit, causing receivables to pile up, the inventory ratio is sometimes very low because they are slow in paying their bills and their suppliers demand cash with order or will not sell them extensive amounts of goods on credit. Inventory should be, at least, equal to receivables and cash to be in safe ratio.

TABLE 4

Assets		*Liabilities*	
Cash	$2,000	Accounts payable	$ 750
Receivables	1,000	Accrued liabilities	250
Inventory	3,000		
		Current liabilities	1,000
Current assets	$6,000		
Working capital	5,000 (5)		
Current liabilities	$1,000 (1)		

Here the working capital is 5 times the current debt. We have met dealers who considered themselves well fortified against financial disaster when their working capital showed a similar ratio to current liabilities. They overlook the fact that too much working capital is as bad as too little because seed money must be kept working to harvest profits. More than one business concern has closed its doors, paid off its creditors dollar for dollar from a fat bankroll and auctioned off its holdings. Too much money broke them. The management didn't spend it for modernization or other forms of business betterment, hence, their sales declined to a point where it didn't pay to stay in business.

TABLE 5

Assets		*Liabilities*	
Cash	$1,000	Accounts payable	$2,000
Receivables	500	Loans payable	2,000
Inventory	1,500		
		Current liabilities	$4,000
Current assets	$3,000	Floating debt	1,000
		Current assets	$3,000

When your current liabilities exceed current assets, you have a floating debt. Not an envious position to be in.

TABLE 6

Current assets	$ 3,000	Current liabilities	$ 4,000
Fixed assets	27,000	Fixed liabilities	5,000
		Net worth	21,000
Total	$30,000	Total	$30,000

You may have a floating debt and still show a good net worth. You may show a satisfactory net profit on a satisfactory sales volume, at least for a limited time, and your business have a floating debt. But you couldn't get a loan from a banker with this type balance sheet and eventually the sheriff would take over. We have found a floating debt on the books of more than one dealer who thought he was doing well because his profits, sales, and net worth were substantial. A floating debt may creep up on you at any time, particularly in a period such as this, when shortages or price control may depress dollar volume, when high taxes and costs may net skeleton profits.

TABLE 7

Annual sales	$30,000
Working capital	5,000
Turnover of working capital	6
(Sales divided by the average working capital carried over the year).	

Working capital has a turnover just like stock or labor. When net profit and sales volume for a period are satisfactory, those who use this formula assume that the working capital turn at that time is desirable and try to maintain it. The turn is a matter for the businessman to decide for himself based on his experience figures.

TABLE 8

Working capital	$5,000
Net profit on sales	1,000
Net profit on working capital	20 per cent

Some businessmen use this yardstick to measure the adequacy of working capital. Your own experience figures will fix the most desirable turn. If any deviation therefrom, investigate your working capital set-up.

TABLE 9

Current assets	$10,000	Current liabilities	$ 5,000
Fixed assets	10,000	Net worth	15,000
Total	$20,000	Total	$20,000

(*Please turn to page* 156)

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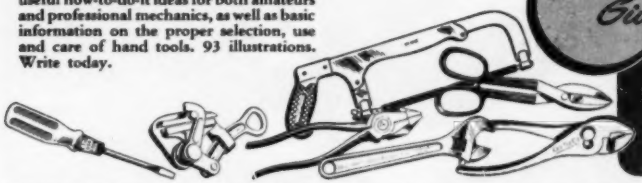

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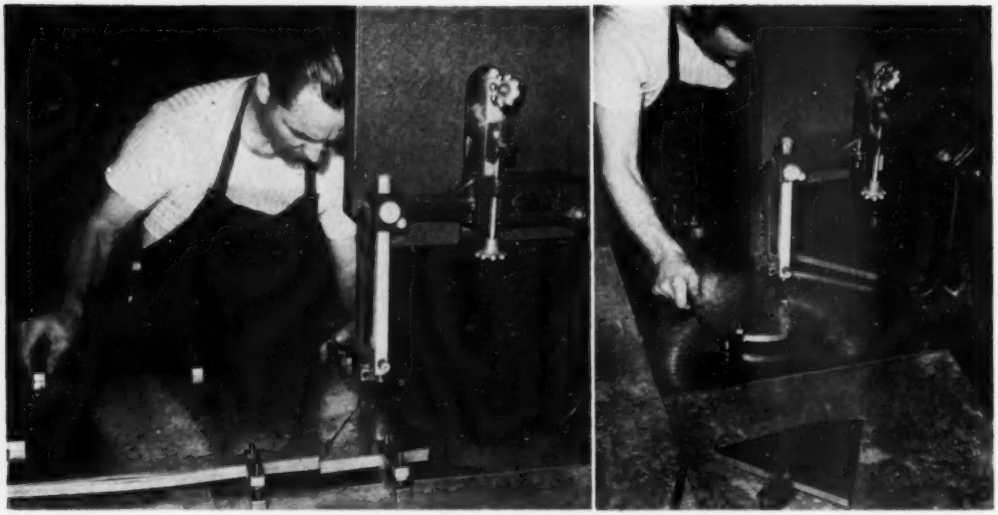

Left: Here's the sheet metal band saw in operation. Harold Torkelson is making the first cut on fifty blanks for 3½ by 10 right reverse ells. Right: The center cut has been removed. The clamp shown will be removed and reclamped at another point on the blanks.

Band Saw Cuts Fitting Production Time

PRESENT day labor rates make it imperative for the heating and sheet metal shop to cut labor charges to the lowest point possible. One of the foremost methods of achieving this end is to use a metal band saw to cut out blanks for duct fittings.

Time Studies

This page shows some actual time study results on cutting out various fittings. A heating and sheet metal shop in Minneapolis installed the equipment and found cost of duct-work fittings could be cut 85 per cent.

Setting up the saw is quite simple. A stack of 50 blanks is clamped together to hold them for uniform cutting. The pattern is scribed on the top sheet and cut out at speeds up to 15 in. per minute. This contractor now believes: One man with a power saw equals six men with hand shears.

Quantity		*Saw*	*Hand*
50	16C Ell Wrappers	5 min.	1 hr.
50	90C Ell Cheeks	15 min.	1½ hrs.
50	Trunk Adaptors	20 min.	3 hrs.
50	Reverse Ells (complete)	30 min.	3 hrs.
50	Offsets Wrappers	5 min.	¾ hr.
50	Boxes (wrappers)		
	Forced air	15 min.	¾ hr.
	Warm air	15 min.	¾ hr.
	Return air	15 min.	¾ hr.
50	No. 5 Boot for No. 8 Box	30 min.	3 hrs.

The notching operation has begun. One piece for this fitting cut out with hand shears used to take three to five minutes. With the sheet metal saw 50 are cut in one-half hour.

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Current Control Picture

The National Production Authority recently held a meeting with the Warm Air Heating Industry Advisory Committee regarding the materials supply situation. NPA summarized the picture as follows:

"Sheet and strip—There is a shortage of galvanized sheets, and future cuts in NPA allocations are anticipated. However, the supply of hot and cold rolled sheets will be improved by the first quarter of 1952.

Copper—The situation is very critical. Committee members said that while the warm air heating industry is not a heavy copper user, the shortage would be felt in some items necessary to the industry's operation.

Zinc—A critical shortage has curtailed production of galvanized sheets. Brass mill production may be cut because of the zinc as well as the copper shortage.

Aluminum—Will remain in tight supply with no improvement anticipated during the first three quarters of 1952. NPA said that the expected increase in production will be offset by expanded defense and defense-supporting requirements."

The committee endorsed an NPA proposal to reduce the membership of the committee and still have it represent the furnace, pipe and fitting, and register and grille industries.

A report on simplification, standardization, substitution and other conservation measures undertaken by the industry to save scarce materials was made by a task group appointed at the last meeting. The task group said that the industry has already simplified its products as much as possible.

NPA ORDERS

M-1. Set-asides of iron and steel castings for rated orders. Monthly set-asides of steel castings range from 75 to 80 per cent of the average shipments in the first eight months of 1950. Galvanized sheets are included in the list of products limited and 80 per cent of production is reserved for rated orders. Lead times vary but 45 days is set in most products.

M-4A—NPA order M-4 was revoked and replaced by M-4A. The new order provides that no person may commence any construction that requires more than two tons of carbon steel, 200 pounds of copper, and any quantity of aluminum, alloy steel, or stainless steel without authorization and allotment of materials. CMP Reg. 6 was amended to halt or prohibit construction on projects that have not been given an authorized construction schedule and related allotment of controlled materials. Dir. 1 to CMP Reg. 6 was issued Aug. 3 and establishes procedure whereby persons may place authorized controlled materials orders and defense-rated orders for construction materials where total requirements do not exceed specified quantities. NPA Del. 14 and NPA order M-74 were amended and NPA Del. 7 was revoked to make them conform with the new construction regulations. Amendment of M-74 adds six items to the list for which use of copper is restricted and revoking of Del. 7 returns processing of construction applications from Commerce Department field offices to Washington.

M-6. Steel distributors. To assure flow of carbon steel products to warehouses steel producers are required to allot and ship each month not less than 85 per cent of a warehouse's base tonnage, including DO orders. Base period for warehouses is Jan. 1 to Sept. 1, 1950.

M-8. Tin. Allows use of pig tin to 90 per cent of average monthly use in first 6 months of 1950 for manufacture of tin plate and terne plate. Inventory restricted to 45 days for most tin products.

M-14. Nickel. Prohibits use of stainless steel and high nickel alloys for all sheet metal building applications.

M-15. Zinc. Restricts use of zinc and zinc products to 80 per cent of average use during base period of first 6 months of 1950.

M-24. Tin plate and terne plate. Limits the maximum permitted coating of tin and terne plate. Some applications restricted.

Dir. 3 to M-1—This order provides that a steel producer can choose orders he wants, up to 15 days before expiration of lead times. In the remaining 15 days he must take in the order in which they are received all of the authorized controlled materials orders he can fill. Orders accepted before the 15th day prior to end of lead times must not exceed 90 per cent of the steel producer's monthly capacity.

Dir. 4 to M-1—Provides for a transition to a full CMP in the fourth quarter of 1951. It reserves the former free area steel products for makers of consumer durable goods and passenger automobiles and holders of unrated orders which have been converted to authorized controlled materials orders.

M-47A

An end-product producer's maximum use of steel, copper, and aluminum will be specified either by his CMP allotment, or if he does not receive an allotment, by the classification of his product under M-47A, except for copper used in building materials, which will be handled separately.

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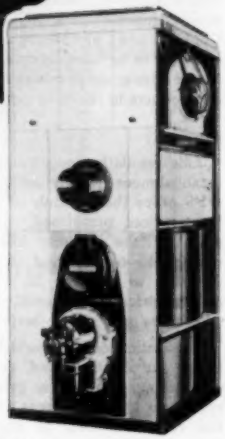

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Provisions include:

1. Copper and aluminum end-use limitations are added to existing steel limitations in M-47A,
2. Products on M-47A's list are allowed consumption of 70 per cent of steel, 60 per cent of copper, and 50 per cent of aluminum, figured on January-June 1950 base period.
3. Establishment of a new list B in which consumption of steel, copper, and aluminum is set at 85, 80, and 75 per cent respectively, of permitted use during the first quarter of 1951.
4. Relaxation of prohibitions on nonoperational use of copper and aluminum in items covered by M-47A, and,
5. Transfer of the point of control of copper and aluminum from the fabricator to the firm which produces or assembles the end-product.

Steel use percentage calculations will be made upon the amount of steel used by the manufacturer in making products during this base period within an item classification of list A and B. Copper and aluminum percentages continue to be based upon a company's use of copper or aluminum for making all products in the base period.

CPR 34

This regulation requires the service establishment to file with the local OPS office the schedule of its charges for services performed. The ceiling price is the highest charge made during the base period of December 19, 1950 to January 25, 1951. This ceiling price list should be posted where the public can inspect it.

Application of this regulation to the warm air heating and sheet metal contracting industry is principally in regard to hourly charges for labor in the service branch of the business. Any established services such as filter replacement or oil burner service are controlled by this regulation.

CMP REGULATIONS

Regulation 1—sets up the basic rules of operation for the Controlled Materials Plan. It explains how steel, copper, and aluminum will be allotted to manufacturers of defense and defense-supporting industries.

Regulation 2—establishes inventory limitations on controlled materials. Carbon steel, alloy steel, and stainless steel are limited to a 45 day inventory. Copper, copper-base alloys, and aluminum are limited to a 60 day inventory.

Regulation 3—establishes the relative preference status of delivery orders for controlled and other materials needed for production of goods deemed essential to the re-armament program and the general economy.

Regulation 4—describes the rules under which distributors may make deliveries under CMP.

Amend. 2 to CMP Reg. 1—To eliminate improper scheduling methods the NPA amended CMP Reg. 1 to make it clear that a mill may not accept an authorized controlled materials order if it cannot be filled during the calendar quarter for which it is valid, unless it is revalidated for a subsequent quarter.

Reg. 1 states that a controlled materials producer who is not required or is unable to accept an order for delivery in the month specified by his customer, but has open space on his schedules during the next two months, must accept the order and fill it as soon as possible if this is satisfactory to the customer.

The amendment emphasizes that if this would mean delaying delivery (from the third quarter to the fourth quarter, for example) the order may be accepted only if the customer certifies that he holds an allotment valid for the fourth quarter. In such case the customer must charge the delivery to his fourth quarter allotment.

Dir. 1 to CMP Reg. 1—gives manufacturers whose operations fall under the Controlled Materials Plan but who use only small quantities of steel, copper, and aluminum in their production a simple method of obtaining needed supplies of those three materials, without applying to the government. Direction 1, states that a producer of a class B product not marked with an asterisk in the Official CMP Class B Product List need not apply to NPA for controlled material if his quarterly requirements for its manufacture, and the manufacture of all other items in the same product class, do not exceed the following amounts of any of these materials: Carbon steel (including wrought iron), 5 tons; alloy steel (except stainless steel), 0.5 ton; stainless steel, none; copper and copper-base alloy brass mill products, copper wire mill products, copper and copper-base alloy foundry products and powder, 500 pounds; and aluminum, 500 pounds. Direction 1 authorizes him to use the allotment symbol SU (smaller user) on delivery orders for controlled material within the limits set. The quantity of B products he can turn out with the material so obtained, plus that in his inventory, will constitute his authorized production schedule. A producer who qualifies for this procedure is also authorized by the direction to apply the rating DO-SU to orders for production materials, other than steel, copper, and aluminum, required to complete his schedule.

Dir. 2 to CMP Reg. 1—Authorizes producers of controlled materials to apply the rating of DO-PM to orders for production materials (other than steel, copper, and aluminum) for use in producing controlled materials.

Dir. 3 to CMP Reg. 1—No manufacturer whose quarterly allotment or advance allotment of carbon steel is equal to or more than a carload lot shall be required to reduce his delivery order for such material below a carload lot. He may order the full carload despite the fact that the amount may exceed the total permitted in one month under Dir. 3. This direction also prohibits any manufacturer from ordering for delivery in one month more than 35 per cent of his total quarterly allotment of any controlled material.

Dir. 4 to CMP Reg. 1—Metal fabricators who acquire title to foreign-produced steel before it arrives in the United States may use it to augment their authorized production schedules under CMP. The new direction stipulates that no copper or aluminum controlled materials above a manufacturer's allotment of these metals may be used in connection with an augmented production schedule.

Dir. 5 to CMP Reg. 1—Stipulates that if a purchaser, through no fault of his own, did not receive the full amount of controlled materials originally ordered for second quarter delivery, this undelivered amount shall not be deducted from his third quarter allotment. If a purchaser placed an order in the second quarter for delivery in the third quarter, he must deduct the amount of such materials from his third quarter allotment regardless whether they were obtained by an authorized CMP order, a rated order, or an unrated order.

CMP Reg. 5 replaces NPA Reg. 4 and provides for the acquisition of maintenance, repair, and operating supplies under the controlled materials plan. CMP Reg. 7 does the same for parts and materials needed by repair-shops. Both of the new regulations provide self-allotment procedures to obtain materials. No application to NPA is required.

Under CMP Reg. 5 any business enterprise may obtain the normal amounts of steel, copper, aluminum, and other materials needed to keep its plants and property in repair and operation, and to make minor capital additions. The allotment symbol DO is authorized as well as the symbol DO-MRO.

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PART VI (Conclusion)

Automatic Pilot Device. A device employed with gas burning equipment which will automatically shut off the gas supply to the burner being served by either direct or indirect means when the pilot flame is extinguished. The pilot burner may or may not be constructed integrally with the device.

Automatic Pilot, Complete Shut-Off Type. An automatic pilot for shutting off, automatically, the gas supply to the main burner and pilot in event of pilot or gas failure, and also for preventing the gas from being turned into the main burner unless the pilot is lighted.

Baffle. An object in an appliance to change the direction of, or retard the flow of air, air-gas mixtures, or flue gases.

Branch Line. Gas piping which conveys gas from a supply line to the appliance.

Btu. Abbreviation for British Thermal Unit which is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Burner. A device for the final conveyance of the gas, or a mixture of gas and air, to the combustion zone.

a. *Injection (Bunsen) Type Burner.* A burner employing the energy of a jet of gas to inject air for combustion into the burner and mix it with the gas.

1. *Atmospheric Injection Type Burner.* A burner in which the air at atmospheric pressure is injected into the burner by a jet of gas.

b. *Luminous or Yellow Flame Burner.* A burner in which secondary air only is depended on for the combustion of the gas.

c. *Power Burner.* A burner in which either gas or air or both are supplied at pressures exceeding, for gas, the line pressure, and for air, atmospheric pressure; this added pressure being applied at the burner.

1. *Pre-Mixing Burner.* A power burner in which all or nearly all of the air for combustion is mixed with the gas as primary air.

d. *Pressure Burner.* A burner which is supplied with an air-gas mixture under pressure (usually from 0.5 to 14 in. of water and occasionally higher).

Central Heating Gas Appliance. A gas appliance normally used as the primary means of heating premises. Ordinarily this includes gas boilers, warm air furnaces, and floor furnaces, but does not include unit heaters, room or space heaters, nor industrial gas boilers.

Chimney. A vertical masonry or reinforced concrete shaft containing one or more flues or vents.

Clothes Dryer. A device used to dry wet laundry by means of heat derived from the combustion of fuel gas.

Combustible Construction. By combustible construction is meant a combustible wall or combustible surface constructed of wood, composition, or of wooden studding and lath and plaster.

Combustion. Combustion, as used herein, refers to the rapid oxidation of fuel gases accompanied by the production of heat, or heat and light. Complete combustion of fuel is possible only in the presence of an adequate supply of oxygen.

Combustion Chamber. The portion of an appliance within which combustion occurs.

Combustion Products. Constituents resulting from the combustion of a fuel with the oxygen of the air, including the inerts but excluding excess air.

Concealed Gas Piping. Gas piping which, when in place in the finished building, will be hidden from view by the structure.

Condensate—(Condensation). The liquid which separates from a gas (including flue gas) due to a reduction in temperature.

Control. A device designed to regulate the gas, air, water and electrical supply to a gas appliance. It may be manual or automatic.

Control Cock. A cock used in piping to control the gas supply to any section of a system of piping or to an appliance.

Conversion Burner. A burner designed to supply gaseous fuel to an appliance originally designed to utilize another fuel.

Cubic Foot (Cu Ft) of Gas. The amount of gas which would occupy 1 cu ft when at a temperature of 60 F, saturated with water vapor and under a pressure equivalent to that of 30 in. of mercury.

Demand. The maximum amount of gas required per unit of time, usually expressed in cu ft per hr, or Btu per hr, required for the operation of the appliance or appliances supplied.

Diversity Factor. Ratio of the

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Draft Hood. A device built into an appliance, or made a part of the flue or vent connector from an appliance which is designed to 1) insure the ready escape of the products of combustion in the event of no draft, back draft, or stoppage beyond the draft hood; 2) prevent a back draft from entering the appliance; and 3) neutralize the effect of stack action of the fiue or vent upon the operation of the appliance.

Drip. The container placed at a low point in a system of piping to collect condensate and from which it may be removed.

Duct Furnace. A furnace normally installed in distribution ducts of air conditioning systems to supply warm air for heating. This definition shall apply only to an appliance which depends for air circulation on a blower not furnished as part of the furnace.

Excess Air. Air which passes through the combustion chamber and the appliance flues in excess of that which is theoretically required for complete combustion.

Exposed Piping. Gas piping which will be in view in the finished structure.

Flames.

a. *Yellow, Luminous or Non-Bunsen.* The flame produced by burning gas without any premixing of air with the gas.

b. *Bunsen.* The flame produced by premixing some of the air required for combustion with the gas before it reaches the burner ports of point of ignition.

Floor Furnace. A completely self-contained unit furnace from the floor of the space being heated taking air for combustion from outside this space and with means for observing flames and lighting the appliance from such space.

a. *Gravity Type Floor Furnace.* A floor furnace depending primarily upon circulation of air by gravity. This classification shall also include floor furnaces equipped with booster type fans which do not materially restrict free circulation of air by gravity flow when such fans are not in operation.

b. *Fan Type Floor Furnace.* A floor furnace equipped with a fan which provides the primary means for circulation of air.

Flue or Vent. A conduit or passageway, vertical or nearly so, for conveying flue gases to the outer air.

Type A Flue or Vent. Flues or vents of masonry, reinforced concrete, or metal smoke stacks.

Type B Gas Flue or Vent. Vent piping of noncombustible, corrosion-resistant material of sufficient thickness, cross-sectional area, and heat insulating quality to avoid excess temperature on adjacent combustible material and certified by a nationally recognized testing agency.

Type C Gas Flue or Vent. Flue or vent piping of sheet copper of not less than No. 24 U. S. Standard gauge or of galvanized steel of not less than No. 20 U. S. Standard gauge or of other approved corrosion-resistant material.

Flue Collar. That portion of an appliance designed for the attachment of the draft hood or flue or vent connector.

Flue or Vent Connector. The pipe connecting an appliance with the flue or vent. This corresponds to the smoke pipe used with solid or liquid fuels.

Flue Gases. Products of combustion and excess air.

Fuel Line. The independent pipe from the meter to an appliance or appliances.

Furnace. A self contained gas-burning appliance for heating air by secondary transfer of heat from the flue gases through metal to the air, usually located outside of the room or rooms being heated.

a. *Gravity Type Warm Air Furnace.* A furnace depending primarily upon circulation of air by gravity. This classification shall also include furnaces equipped with booster type fans which do not materially restrict free circulation of air by gravity flow when such fans are not in operation.

b. *Forced Air Type Warm Air Furnace.* A furnace equipped with a fan which provides the primary means for circulation of air and of sufficient capacity to deliver air at a temperature rise of not more than 100 F above room temperature when operating against an imposed static pressure of 0.2 in. equivalent water column with the furnace operating at its rated Btu input capacity.

Gas Hose. A gas conduit which depends for tightness on joint packing, or any wall structure other than that formed by a continuous one-piece metal tubing member.

Gravity. (See Specific Gravity).

Heating Value (Total.) The number of British Thermal Units produced by the combustion at constant pressure, of 1 cu ft of gas when the products of combustion are cooled to the initial temperature of the gas and air, when the water vapor formed during combustion is condensed, and when all the necessary corrections have been applied.

House Piping. The gas piping beyond the outlet of the meter and extending to the appliance or the appliance connector.

House Riser. The principal vertical pipe which conducts the gas from the meter to the different floors of the building.

Incinerator. An appliance used to reduce refuse material to ashes, and which is sold as a complete unit.

a. *Portable Incinerator.* An incinerator which is a complete unit in itself, and which does not become an integral part of the structure in which it is installed.

b. *Wall Incinerator.* An incinerator which is a complete unit in itself designed to be installed in a fireproof wall or chimney, thereby becoming an integral part of the structure in which it is installed.

c. *Mixer Tube.* The portion of the

Individual Main Burner Valve. A valve which controls the gas supply to an individual main burner.

Limit Control. A device responsive to changes in pressure or temperature or liquid level for turning on, shutting off, or throttling the gas supply to an appliance.

Listed Appliance or Accessory. (See 3.1.2).

Main Burner. A device or group

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of devices essentially forming an integral unit for the final conveyance of gas or a mixture of gas and air to the combustion zone, and on which combustion takes place to accomplish the function for which the appliance is designed.

Main Burner Control Valve. A valve which controls the gas supply to the main burner manifold.

Manifold. The conduit of an appliance which supplies gas to the individual burners.

Manual Main Shut-Off Valve. A manually operated valve or cock in the gas line for the purpose of completely turning on or shutting off the gas supply to the appliance except to the pilot or pilots which are provided with independent shut-off valves.

Measured Gas. Gas which has passed through and the volume of which has been registered by a meter.

Meter. The instrument installed to measure the volume of gas delivered through it.

Mixer. The combination of mixer head, mixer throat and mixer tube.

a. *Mixer Head.* That portion of an injection (Bunsen) type burner, usually enlarged, into which primary air flows to mix with the gas stream.
b. *Mixer Throat.* The portion of the mixer which has the smallest cross-sectional area and which lies between the mixer head and the mixer tube.
c. *Mixer Tube.* The portion of mixer which lies between the throat and the burner head.

Mixer Face. The air inlet end of the mixer head.

Orifice. The opening in a cap, spud or other device whereby the flow of gas limited and through which the gas is discharged to the burner.

Orifice Cap (Hood). A movable fitting having an orfice which permits adjustment of flow of gas by the changing of its position with respect to a fixed needle or other device.

Orifice Spud. A removable plug or cap containing an orifice which permits adjustment of the flow of gas either by substitution of a spud with a different sized orifice or by the motion of a needle with respect to it.

Pilot. A small flame which is utilized to ignite the gas at the main burner or burners.

Primary Air. The air introduced into a burner and which mixes with gas before it reaches the port or ports.

Purge. To free a gas conduit of air, gas, or a mixture of gas and air.

Recessed Heater. A self-contained appliance complete with grilles or equivalent, designed for incorporation in or permanent attachment to a wall, floor, ceiling or partition, either taking air for combustion from the space to be heated or having a sealed combustion system the inlet and outlet of which communicates only with the outside air, and furnishing heated air circulated by gravity or by a fan directly into the space to be heated through openings in the casing. Such appliances shall not be provided with duct extensions beyond the vertical and horizontal limits of the casing proper, except that boots not to exceed 10 inches beyond the horizontal limits of the casing for extension through walls of nominal thickness may be permitted. Where such boots are provided they shall be supplied by the manufacturer as an integral part of the appliance and tested as such. This definition shall exclude floor furnaces, unit heaters and central furnaces as herein defined.

1. *Gravity Type Recessed Heater.* A recessed heater depending on circulation of air by gravity.
2. *Fan Type Recessed Heater.* A recessed heater equipped with a fan.

Regulator. A device for controlling and maintaining a uniform gas supply pressure.

Relief Device. A safety device designed to forestall the development of a dangerous condition in the medium being heated, by relieving either pressure, temperature, or vacuum build-up in the appliance.

a. *Pressure Relief Valve.* An automatic device which opens or closes a relief vent, depending on whether the pressure is above or below a predetermined value.
b. *Temperature Relief Valve.*
   1. *Fusible Plug Type.* A device which opens and keeps open a relief vent by the melting or softening of a fusible plug or cartridge at a predetermined temperature.
   2. *Reseating or Self-Closing Type.* An automatic device which opens and closes a relief vent, depending on whether the temperature is above or below a predetermined value.
c. *Vacuum Relief Valve.* An automatic device which opens or closes a relief vent depending on whether the vacuum is above or below a predetermined value.

Relief Opening. The opening provided in a draft hood to permit the ready escape to the atmosphere of the flue products from the draft hood in the event of no draft, back draft, or stoppage beyond the draft hood, and to permit inspiration of air into the draft hood in the event of a strong chimney updraft.

Room or Space Heater. A self-contained gas-burning appliance installed in and for heating rooms. This definition shall not include unit heaters, central heating gas appliances, nor garage heaters.

Secondary Air. The air externally supplied to the flame at the point of combustion.

Semi-Rigid Tubing. A gas conduit having semi-flexible metal wall structure.

Service Pipe. The pipe which brings the gas from the gas main to the meter.

Shut Off. (See Control Cock.)

Smoke Pipe. (See Flue or Vent Connector.)

Specific Gravity. As applied to gas, specific gravity is the ratio of the weight of a given volume to that of the same volume of air, both measured under the same conditions.

Thermostat. An automatic device actuated by temperature changes, designed to control the gas supply to a burner, or burners, in order to maintain temperatures between predetermined limits.

Unit Heater. A self-contained gas-

(*To page* 81)

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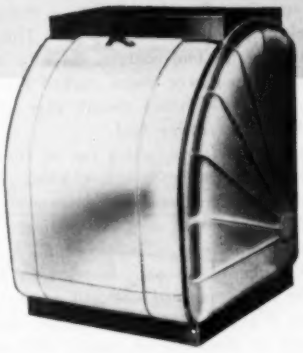

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My last year's gas-conversion customers are today's Viking Blower prospects. This means I get added business and profits from the single source."

L. C. ADAMSON,
Air Conditioning & Heating Service Co.,
3922 Troost, Kansas City, Mo.
"I like the Viking's swell spring thrust take-up which eliminates blower wheel rattle. It gives the 'Qui-Ette' name real meaning. Quality features like the spring take-up, Viking motor mount, and the once-a-season lubrication system insure me against costly call backs; mean added profits."

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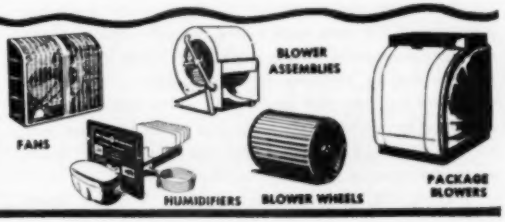

Sheet Metal Blank Production With Router

ERNEST E. ZIDECK

IN THE production of large size aluminum sheet blanks cut on curved lines, as required in aircraft fuselage and wing construction or fabrication of ductwork elbows, routing can be considered along with other known material cutting practices. In fact, where blanks are of sizes which could not pass through a bandsaw's throat, routing must be specified because it is the only other sheet cutting process allowing stacking and cutting many sheets simultaneously. This stacking speeds up blank production and reduces costs. The term routing is derived from the cutting operation resulting in a road or route made by the cutting tool in the stacked sheets.

Tool Described

Sheets are stacked, a steel form placed on top and cutting is then done with a rotating bit shaped like a milling machine cutter. It usually is beween 1/4 and 3/8 in. diameter and about 2 in. long. Its upper end widens into a 1 in. diameter shaft, cylindrical for approximately 2 in. and then shaped to fit into a chuck, not unlike the chuck and drill in a drill press. This larger diameter portion of the tool contacts the edge of the steel plate form fastened over sheets stacked for routing. It rotates along the form's smooth edge which serves as a guide to the cutting tool.

Steel plate forms, which can be from 1/4 to 1 in. in thickness, depending on sizes of blanks, are made smaller by the difference between diameters of cutting tool and guide. If the tool is 3/8 in. diameter and guide 1 in. diameter, the form is five sixteenths inch inward of the cutting edge of the tool. In other words, when a blank is cut to its specified size and contour, the steel form above it is actually smaller by the amount of the difference in diameters of cutting tool and guide. This permits guiding of the cutting tool along the line marked on the blank. The form's edge is slightly rounded and then polished to facilitate smooth travel of the guide.

Aircraft Machine

Fig. 1 of accompanying drawings shows a routing machine as used in modern aircraft factories. This machine differs from older makes of routers in that the arm holding the cutting tool is guided by the operator along the perimeter of the steel form bolted through stacked sheets to underlying wood which in turn is bolted to the adjustable bed or platform of the machine. Sheets are stationary and the tool moves. In older makes, cutting was done in one place upon the bed of the machine, and the operator had to manipulate the assembly of form, sheets and base as is done in bandsawing.

Drawing Fig. 1 is self-explanatory. A heavy stand with a wide outflaring base is bolted to concrete floor. Platform *E* is adjustable up and down by *E-E*, which needs no detailing here as it is in common use on bandsaws and drill presses. Head *Z* moves on roller bearings laterally. Arm *Y* moves in *Z* forward and back on roller bearings. Motor *W* rotates shaft extending through *Z* to *V*, where transmission rotates shaft *U* holding chuck *T* which in turn holds guide *D* and cutting bit *C*. Operating on roller bearings, head *Z* moves easily upon its stand to either side of platform *E*. Arm *Y* likewise slides easily through *Z*, so that the operator can guide *D-C* along edge of bolted down form *F* without effort. Sheets *G* repose on plywood which fastens by heavy wood screws to masonite or hardwood base bolted permanently to platform *E*. In changing sheets for routing wood screws are loosened from their hold in the masonite or hardwood base. This base can be used for more than one pattern blank, as it is easily replaceable. Wood screws through *F* and *G* should be threaded at their ends only, leaving their stem unthreaded so that it fills holes in *F* and *G* to hold sheets in position when *D* presses against edge of *F* and *C* cuts through *G*.

Plan View

Fig. 2 is a plan view of *F* above sheets *G* and plywood base. Plywood is used because it is soft and bit *C* can easily cut into it, making a groove in it in which it travels on subsequent installations of sheets for routing. Where there are no holes in blanks which could be used for bolting it is necessary to provide lugs *L-L*. These lugs can be part of form *F* or welded to *F*. They are preferably placed on straight lines along a curving perimeter of *F*, as it is easier to trim sheets on straight lines. Trimming of sheets after having been routed by *C* between lugs *L-L* must be done by hand. As lugs interfere with continuous travel of *C* through sheets *G*, it is rather more economical to make form *F* of heavier plate so that a minimum of lugs will hold it tight over sheets *G*. Holes *X* through sheets for insertion of bit *C* are placed near *L-L*, so that *C* can travel from lug to lug before changing to another hole *X*. Broken lines indicate cutting line, removed from edge of *F* by aforesaid difference in diameter of *D* and *C*.

The assembly of form *F* and sheets *G* on plywood is shown in elevation in Fig. 3. It will be noted that bolt caps are recessed in wood so that when the assembly is placed on masonite or hardwood block bolted to *E* Fig. 1, it rests in a level position. This is important. Platform *E* surface is uniformly on 90 deg in relation to shaft *U* and bit *C*. Block bolted to it must be level to maintain the 90 deg relation over its full extent. Similarly,

(*Continued on page* 81)

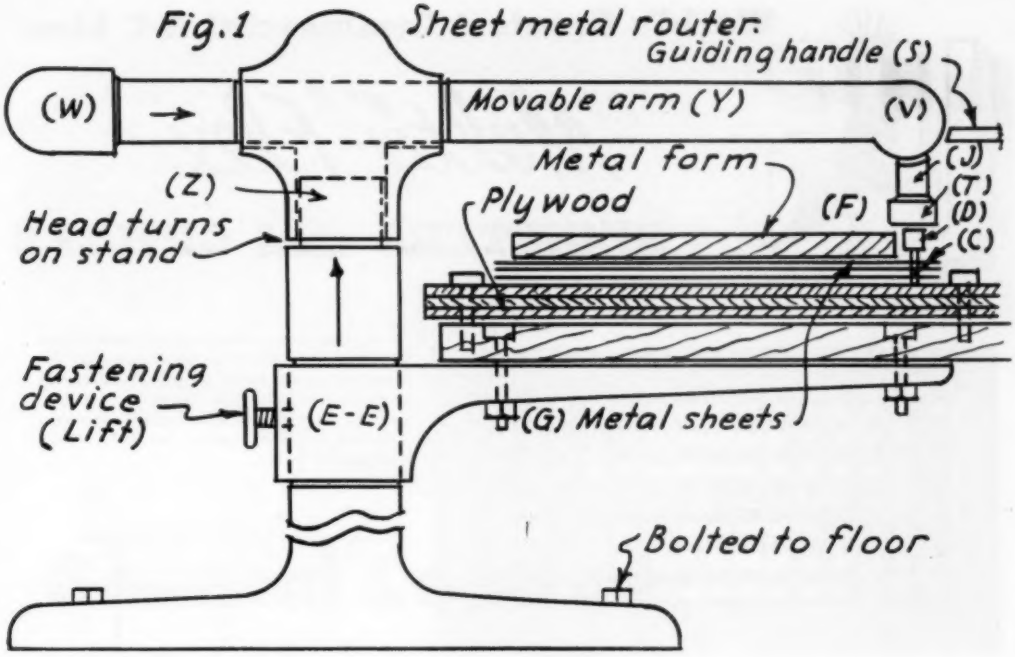
Fig.1 Sheet metal router.
Guiding handle (S)
(W)
Movable arm (Y)
(V)
(J)
(T)
(D)
(C)
Metal form
Plywood
(F)
(Z)
Head turns on stand
Fastening device (Lift)
(E-E)
(G) Metal sheets
Bolted to floor

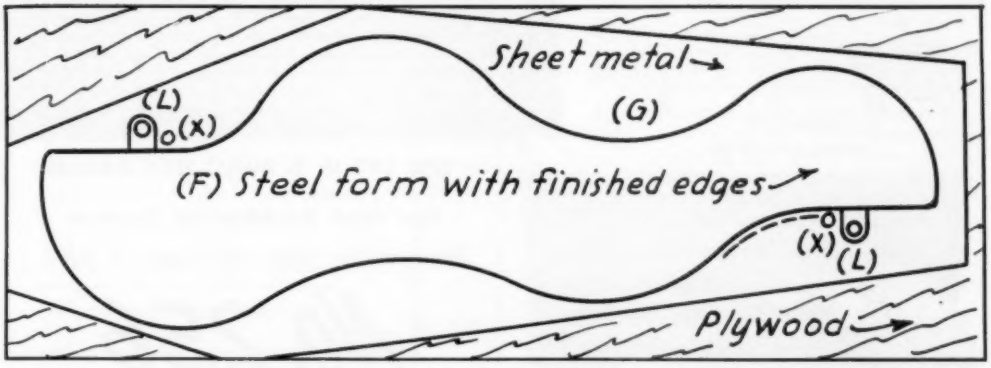
Fig.2 Steel form bolted through sheets to wood.
Sheet metal
(G)
(L)
(X)
(F) Steel form with finished edges
(X)
(L)
Plywood

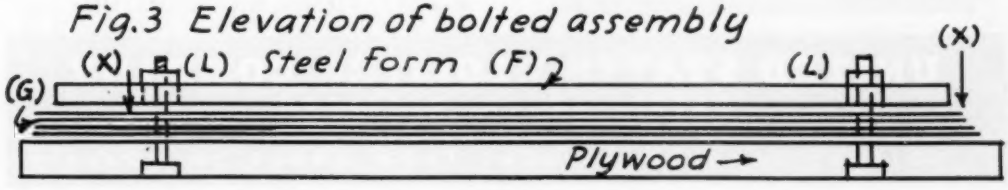
Fig.3 Elevation of bolted assembly
(X)
(L)
Steel form (F)
(L)
(X)
(G)
Plywood

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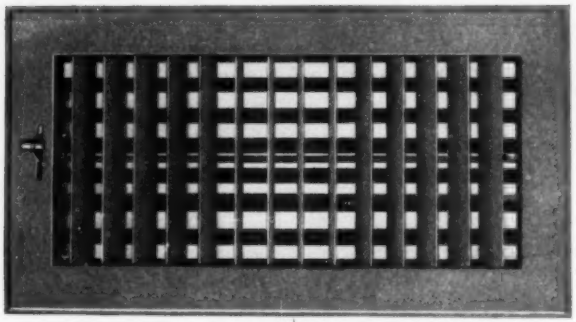

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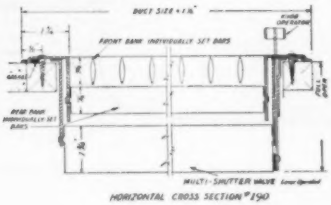

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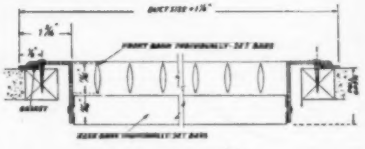
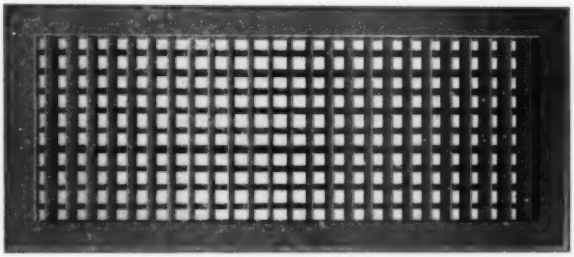


HORIZONTAL CROSS SECTION #193



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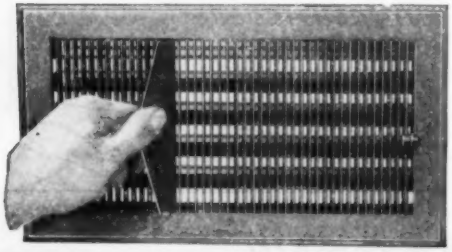

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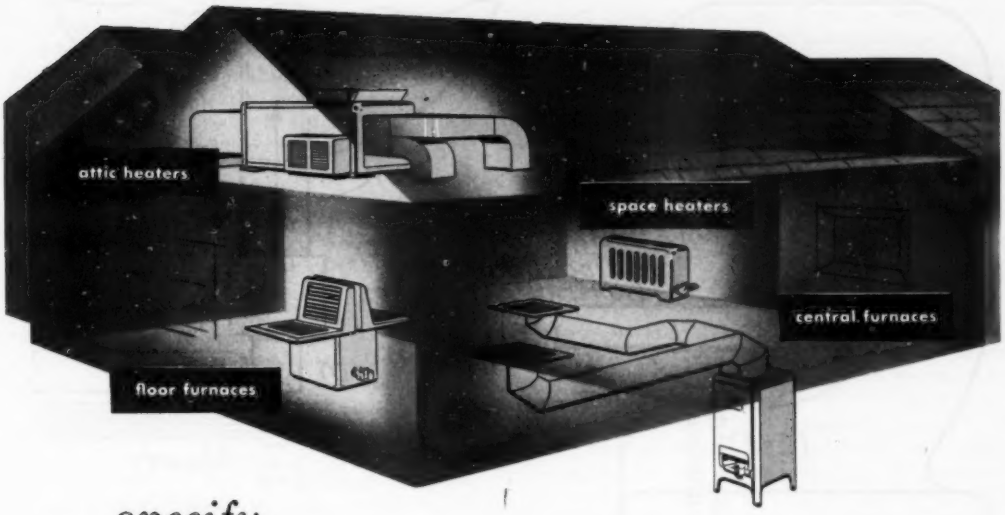

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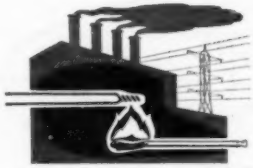

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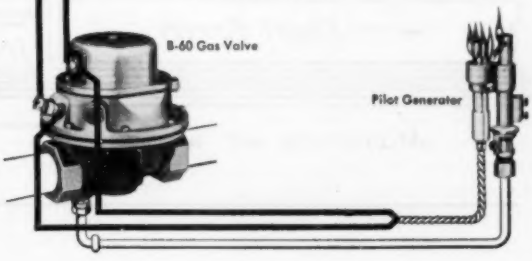

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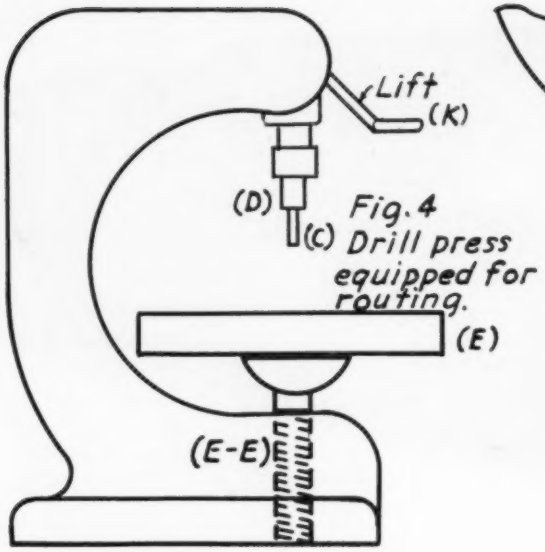

Fig. 4 Drill press equipped for routing.

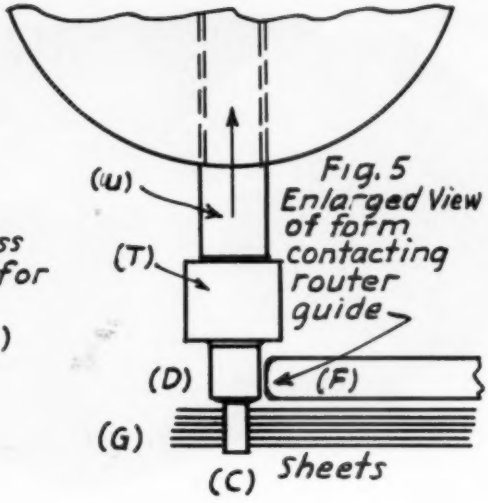

Fig. 5 Enlarged View of form contacting router guide

Fig. 6 Routing wing stiffeners

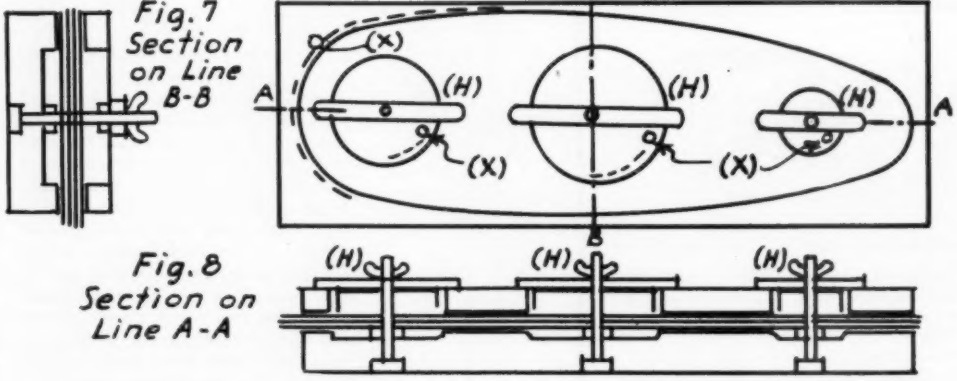

Fig. 7 Section on Line B-B

Fig. 8 Section on Line A-A

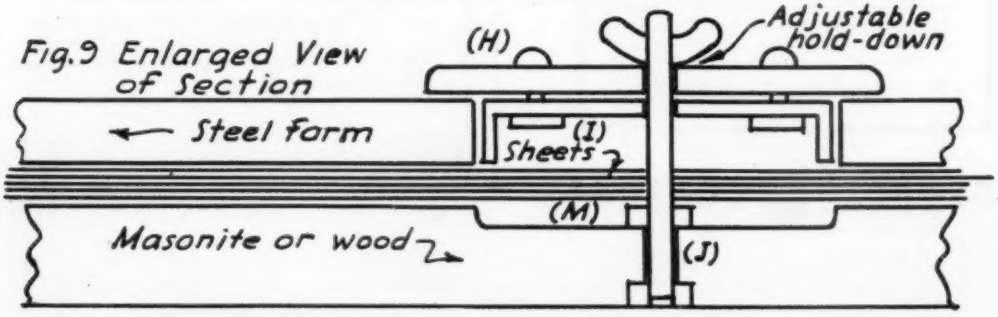

Fig. 9 Enlarged View of Section

(*Continued from page 76*)

the assembly of *F* and *G* and plywood must, when fastened by wood screws, continue the level and the relation. Were the assembly out of level upon *E*, bit *C* would cut the sheets unevenly. As long stem screws are less dependable for fastening as required for *F* over *G*, separate bolts should be used through lugs *L-L* and plywood base, and other screws through plywood base into the block above *E*, as shown in Fig. 1.

Fig. 1, 2, and 3 are sufficiently clear to acquaint the reader unfamiliar with routing with the essentials of this technique. Fig. 2 illustrates the relation of form *F* to bit *C* which cuts sheets *G* on lines marked from a pattern made to specification. That screws or bolts holding *F* to sheets *G* must provide a secure fastening underlying plywood and through plywood to block on *E* is obvious. It might prove better to use bolts with recessed heads in plywood reaching through sheets *G* and form *F* which then are secured by nuts to the assembly. If we do this, choosing plywood of sufficient thickness to permit fastening bolts by recessed nuts, as in Fig. 9, would leave the bolts secured permanently in the plywood base and sheets *X* would then slide in their holes over bolt stems, facilitating insertion of new sheets for successive assemblies. Holes in sheets are punched beforehand.

Drill Press Modified

Fig. 4 shows a drill press equipped with chuck *T*, guide *D* and cutting bit *C*. Platform or bed *E* operates up and down by threading *E-E*, and *T-D-C* is adjustable up and down, as required for insertion and lifting of *C*, by handle *K*. Fig. 5 is an enlarged view of *T-D-C*, showing edge of form *F* slightly rounded (and polished) contacting guide *D*. While routing tools *D-C* can be mounted into a drill press by a suitable chuck *T;* and masonite or hardwood block may be secured to bed *E* by C clamps for holding such assemblies as would pass through the throat of the machine; the use of router tools in a drill press is best suited for cutouts in wall of extrusions.

Fig. 6 relates to form *F* placed over sheets *G* for routing wing stiffeners, used in various sizes in any plane wing construction. The large circles cut out in *G* are there to facilitate riveting. A bucking operator reaches through the holes and holds his tool in place while his partner on the outside of the wing applies riveting gun to rivets through plane skin. There are several other sheet aluminum items in aircraft, with openings as shown or with smaller diameter holes, serving identical purpose or put into these components to minimize the overall weight of the structure. Where such holes occur in blanks, lugs are unnecessary for bolting down the assembly form, and holddowns depicted more clearly in Fig. 9 are used instead. These holddowns are shown over form *F* in Fig. 7, which is a crosscut section on line *B-B*, and a longitudinal section on line *A-A* in Fig. 8, of assembly Fig. 6.

Referring to Fig. 9, steel strip *H* extends by about 2 in. over form *F*. On the inside is fastened a braked strip *I* by rivets or spotwelds fitting inside the hole in *F*. As a braked strip might not fit accurately enough in the wall of plywood in the cutout, a masonite strip contacting the wall more closely may be used instead. A ½ in. bolt hole locates centrally for bolt *J* which is secured by recessed nuts in 2 in. thick wood base. Bolt *J* is threaded for wingnut shown, which presses *H-I* down over form *F*. Bolt stud *J* is so located in relation to *I*, that *H-I* turns easily upon it, forward and back within the hole in form *H* and its underlying wood base, as required for bit *C* to travel around wall of *H* guided by *D*. Here again form *F* is drilled oversize to permit *C* cutting *G* on lines marked by blank pattern.

In current practice, bolts *J* are securely lodged in 2 in. thick masonite or hardwood base, as shown in Fig. 9. This base in turn is secured by adequate bolts to platform *E* Fig. 1. There is a hollowed section in the masonite base, in which bit *C* moves and in which is hidden the nut holding *J* in position. For a more secure hold of *J* in its permanent position in the masonite, adequate washers are placed under the nuts. There being no lugs *L-L* attached to form *F*, bit *C* travels the entire perimeter of the form with no stop. Holes *X* through sheets *G* serve for insertion of bit *C* for cutting operations. Routing inside large holes is done by inserting bit *C* in hole marked *X* and moving it to near *H*, when *H-I* is loosened by wingnut and moved out of way. This is safe to do, as *I* closing tightly against wall of *F* and base allows no shifting. Also, in this instance, two other bolts hold the assembly in position. Fig. 6 and 9 illustrate this feature of holddowns *H* very well.

AGA Standards — *From page 74*

burning appliance of the fan type, designed for the delivery of warm air directly into the space in which the appliance is located.

Unmeasured Gas. Gas which has not passed through and the volume of which has not been registered by a meter.

Vent. (See definition of Flue or Vent.)

Appendix A
Gas Meter Installation

Location

a. Gas meters should be installed as near as practicable to the point where the service enters the building and should be so located as to be readily accessible for examination, reading and replacement.

b. The gas meter should not be installed in a small, unventilated or confined space.

c. A gas meter should not be placed where it will be subjected to damage, such as in driveways, public passages, halls, coal bins, etc., or where it will be subjected to excessive corrosion.

d. Gas meters should be located at a safe distance from equipment where there is an unguarded flame or the possibility of electric sparks. It is desirable to avoid extreme temperatures and sudden extreme changes in temperature.

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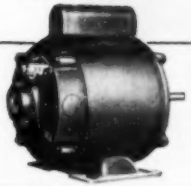

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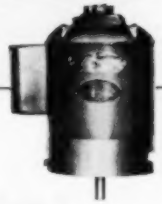
TYPE SC — Squirrel Cage Polyphase Motor built in fractional sizes for all torque requirements.



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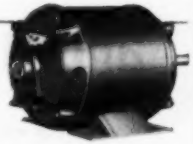

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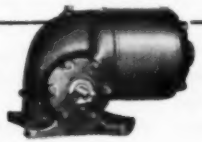

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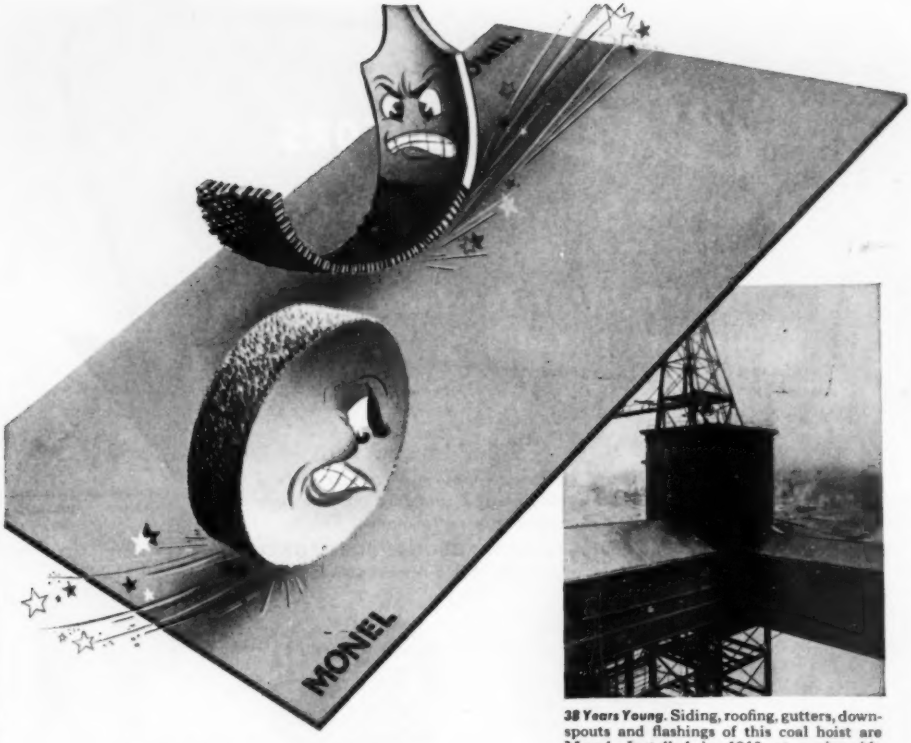

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Fundamentals Of Sheet Metal Practice

PART VIII

CHARLES SEEL

Alexandria, Va.

IN THE fabrication of round or flat oval ducts the first step is to determine the amount of metal required.

For round pipe there are several figures which can be used, either fractions or decimals. They are all variations of pi, the Greek letter. This figure is the familiar 3.1416, which is properly 3.1415666, to which can be added as many sixes as desired. The number will never come out even. It is for this reason that all circumferences of circles are written correct to four figures. The circumference is equal to the diameter multiplied by pi. Thus, 2 x pi = 6.2832 in.; 6 x pi = 18.8496 in.

Change to Fractions

Common practice is to take the first two figures of the decimal and reduce to sixteenths as follows. A 6 in. pipe requires 18.8496 in. Multiplying 0.85 by 16 gives a result of 13.60/16. As .60 is greater than half, the figure is changed to 14/16 or 7/8 in. Then 18 7/8 in. of metal will be used for a 6 in. pipe with a butt seam. A 4 in. pipe would require 4 x 3.1416 or 12.5664 in. Change .5664 to .57 and multiply by 16, giving a result of 9/16 in. Thus a 4 in. pipe will require 12 9/16 in. of metal.

A flat oval pipe is in effect just a round pipe pulled apart. So it is only necessary to add twice the distance of *x* in Fig. 68. Thus a 4 by 6 in. flat oval duct will require 12 9/16 in. plus 2 x 2 in. or 16 9/16 in., Fig. 68, no allowance being made for the seam.

There are several alternate methods used, all of which involve a modification of 3.1416. Some men use 3 1/7 or 22/7, others use 25/8, and some use 3.14.

One short cut method that works well is as follows:

3.1416 = 3 1/7

1/7 = 9/63

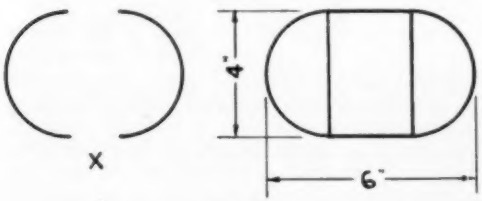


Fig. 68

change 9/63 to 9/64 and use 3 9/64 to represent pi. Thus a 5 in. pipe will take:

5 x 3 9/64 or 15 45/64 in.

For convenience this figure can be changed to 15¾ in.

Many shops post a small chart which lists various diameters and circumferences reduced to quarters, eighths, or sixteenths of an inch for quick reference.

To reverse the process and find the diameter of a circle when the circumference is given, it is only necessary to divide by pi.

Circumference/pi = diameter

This same result can also be obtained by multiplying the circumference by 0.3183, thus:

25.3128 x 0.3183 = 7.988 or 8 in.

The simplest cross seam used for round or flat oval work is the butt seam, for which no metal allowance need be made. The application of a butt strap in this type of work is the same as in other seaming.

Another cross seam is the crimped, or crimped and beaded seam for which no allowance is made. In this case one end of a pipe is reduced in size enough to enter the end of the next pipe.

A lapped seam can be slipped together and left that way or it may be soldered if the application requires it.

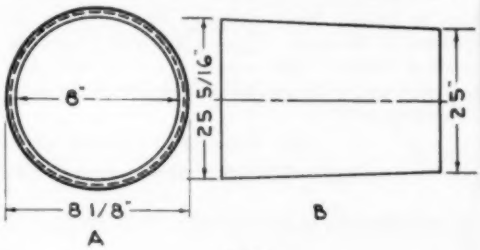


Fig. 69

Round and flat oval ducts are generally figured from the inside diameter and a pattern made to suit this dimension. It is therefore necessary to add to the circumference, enough material to make the finished pipe conform to the inside diameter. This amount is ascertained by finding the mean diameter, which is a line passing through the center of the metal. Fig. 69a.

So to find the stretchout of an 8 in. duct made of 16 gauge metal (.0625 or $\frac{1}{16}$ in.), add the thickness of the metal to 8 in., making 8.0625 the mean diameter. Then multiply by pi, 3.1416 x 8.0625, which gives 25.328 in. or 25 $\frac{5}{16}$ in. for the large end. By this method the small end will measure 8 in. minus .0625 multiplied by pi or 24.944 in. which gives a figure of 25 in. for the small end.

Another method is to take the circumference of an 8 in. pipe, 25.132; multiply the thickness by pi, .0625 x 3.1416 or 0.199 in., and add the two, arriving at a result of 25.32 or 25 $\frac{5}{16}$ in. Fig. 69b.

Sheet Variation

While this method is mathematically correct there is usually a variation in the thickness of sheets and there would be many times when trouble might arise in joining sections. The simplest way to determine the length for the small end is to cut two strips of the metal to be used and make them equal length, in this case 25 $\frac{5}{16}$ in. Roll both strips to a circle, place one inside the other and while holding the outer strip with its edges together mark the lap on the inner one. This will give the correct size for the small end.

Sizing Small End

The following table has been developed for determining the requirement for the small end for various gauges of metal.

Gauge	Thickness	Deduct for small end (in.)
28	0.015	$\frac{3}{16}$
26	0.018	$\frac{3}{16}$
24	0.025	$\frac{1}{4}$
22	0.031	$\frac{5}{16}$
20	0.037	$\frac{5}{16}$
18	0.050	$\frac{3}{8}$
16	0.0625	$\frac{7}{16}$
14	0.078	$\frac{7}{8}$

These figures are approximate, depending on variations in gauges. Some mechanics figure 7 times the thickness of the metal. The way this table is used depends on whether a tight or loose joint is desired. Flat oval pipe can be figured as a round pipe of the same circumference.

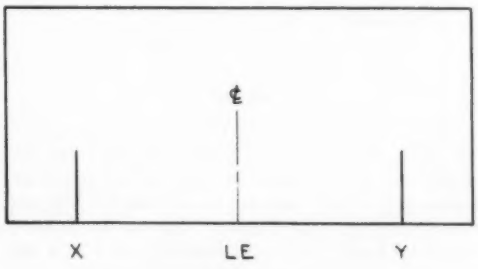


Fig. 70

After determining the amount of metal needed for the large end, measure this distance along the end of the sheet from *x*, located about ½ in. from the left edge, to *y* the full required length. Next find the center of distance *x-y*. The example we have been using is 25 $\frac{5}{16}$ in., the center of which is 12 21/32 in. Fig. 70.

The center line at *L-E* is scribed across the sheet to point *c*. The small end is marked off at *a* and *b*, in this case being 25 in. Lines are now scribed from *a* to *x* and from *b* to *y*. The proper margin or edge *m* is now added to each side, according to the type of seam to be used and the gauge of the metal. In this case a ¼ in. grooved seam is specified. For this example 13/32 in. is added to each side and the pattern cut by shearing on these outer lines.

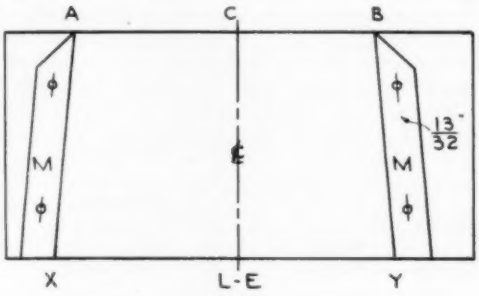


Fig. 71

Lines *a* and *b* are the dimension lines, sometimes called the dead line. In cutting, the dead line should never be crossed because it would result in a gap in the finished pipe. The corners are clipped at *a* and *b* to identify the small end of the pipe. It is not necessary to measure the size of this clipped corner since it is only for identification purposes.

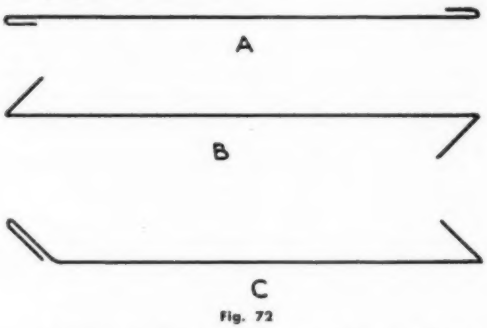
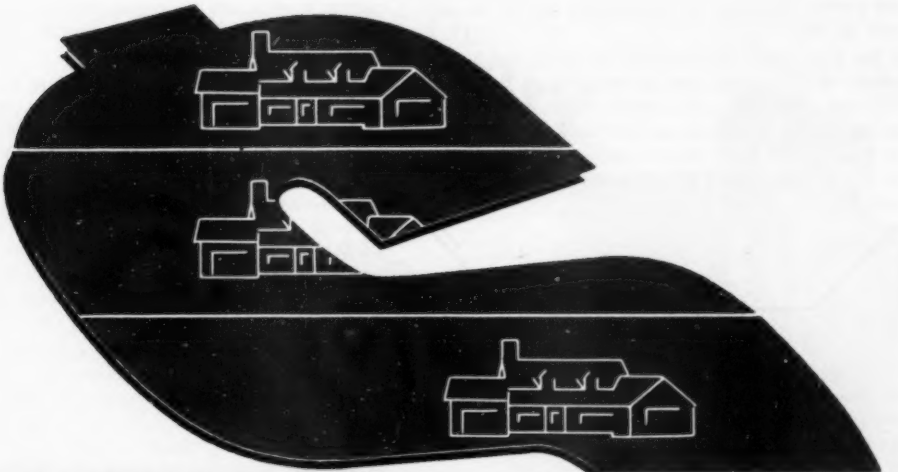


Fig. 72

Next step is to mark off ¼ in. along the edge of each seam. These lines can be placed on the same side of the sheet and marked with a prick punch or they can be marked on each side of the sheet. These lines are to indicate the bends to be made in the brake. It is also possible to complete the seam in the bar folder or the pipe folder. When bent in the brake, these bends can be made in three ways before rolling or forming. The three possible bends are shown in Fig. 72. The bends in *a*



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are made to 180 deg; in *b*, to 135 deg; and in *c* to 135 and 45 deg.

For type *a* and *b* the front rolls of the slip roll former should be far enough apart to avoid closing the edges. For type *a* the sheet is inserted in the machine, moved up against the front roll and then bent upward. This is done on both long sides to produce the shape shown in Fig. 73. The rear roll is then adjusted and the pipe rolled to a circle.

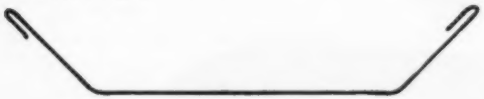

Fig. 73

For type *b* the procedure is the same, excepting that the two edges are brought to 180 deg by forcing each one between the front rolls. The pipe is then rolled to the finished circle. Sometimes a strip of metal is placed in the seam edges when rolling pipe but this is not really essential.

For type *c* the sheet must be slipped into the rolls from the end and then rolled to a circle. It is very good practice to have the edges of grooved pipe be short of meeting after forming. With this condition there is a natural outward strain on the seam when the edges are hooked together.

In the grooving operation *a* and *b* are grooved for an inside seam on the grooved bar or track and for an outside seam on a smooth track by the hand groover and mallet.

Type *c* is hooked together and smoothed flat on a smooth bar, no grooves being necessary. The seams are then secured by center punching, riveting, or notching.

When flat oval pipe is made with a grooved seam, the pattern is made with the proper allowance for the small end. Lines are drawn across the sheet to meet the points at the half circle, 1, 2, 3, and 4.

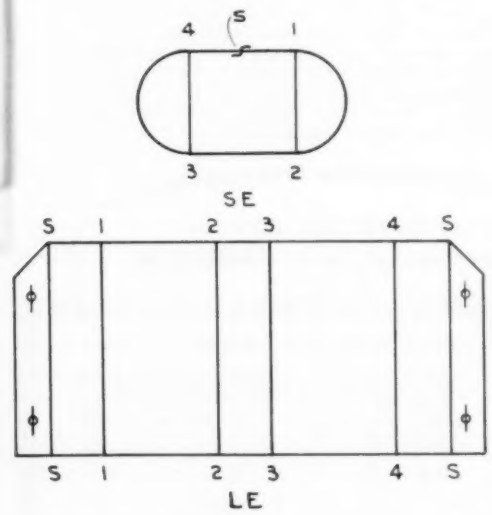

Fig. 74

The seam allowance is added, 13/32 in. on each side, and the guide lines for the ¼ in. seam scribed. The seam edges are then bent as described previously. While in the machine a slight kink or upward bend is made at 1, 2, 3, and 4. The sheet is then slipped between the rolls from the end of the machine and half circle rolled between 1 and 2 and 3 and 4. Fig. 74. While rolling the sheet it is necessary to keep sections *s* to 1, 2 to 3, and 4 to *s* in a flat condition. A template can be made to the shape of the flat oval and used to check the finished pipe.

In fabricating riveted pipe pattern layout is the same as for grooved pipe. The seam allowance for riveting is largely a matter of personal preference. Some generally accepted allowances are: $\frac{5}{16}$ in. for 28 and 26 gauge; $\frac{3}{8}$ in. for 24 and 22 gauge; ½ in. for 20, 18, and 16 gauge; and $\frac{5}{8}$ in. for 14 gauge.

This edge is split between the ends of the pattern. A $\frac{5}{8}$ in. seam calls for $\frac{5}{16}$ in. on each end. The small end of the section is determined as noted and the corners clipped.

To form or roll a section of round pipe for a flat seam, either butt or lap, the front rolls of the slip roll former should be tight enough to grip the metal slightly. The sheet is placed between the front rolls and with the edge of the sheet slightly past the center of the rolls the sheet is bent upward. This results in the condition shown in Fig. 75.

Fig. 75

The pipe is then completed by rolling to a circle. Round pipe should be rolled so that the edges overlap instead of being short of meeting as in the grooved pipe. This overlap may be 1 in. or more and will aid the mechanic considerably when riveting the seam. This method applies to elbows as well as straight sections.

Some mechanics leave the edges flat when they roll pipe for a welded butt seam. Then after the seam is welded it will stick up. It can then be flattened to a circle on the round stake.

When the sheet is too heavy to curl in the rollers, it can be placed on the round stake and the edge bent with a mallet. After this step the sheet can be formed as usual. Some mechanics bend only one edge, the one which will be exposed when riveted. On heavy gauges to ⅛ in. the practice of bending both edges is to be recommended.

It is possible to form 4 in. pipe, ⅛ in. thickness, up to 30 in. in length, with this method. A simple method of producing the bent edges on heavy material is to insert the sheet from the rear of the rolls with the movable roll just above the level and operate the rolls in reverse.

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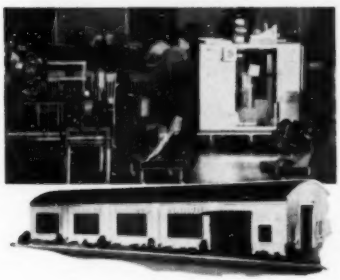
TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSIONS—for fast, smooth shifting • HYPOID REAR AXLES—for dependability and long life • NEW TORQUE-ACTION BRAKES—for light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—for medium-duty models • NEW TWIN-ACTION REAR BRAKES—for heavy-duty models • NEW DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • NEW CAB SEATS—for complete riding comfort • NEW VENTIPANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

Bread and Butter For Both of Us—

Specialization safeguards Winkler Dealers



Winkler Training Institute

In this completely equipped building Winkler employs modern Army training methods to speed up learning. In the Sales and Engineering Schools, Winkler trainees *hear . . . see . . . and actually do the things* which assure successful selling and the proper application of Winkler Products.

Just as the sale of heating equipment is *your* bread and butter, so it is with *us!*

Winkler makes quality heating equipment—*and nothing else!* The development and production of this material is not secondary to some other, more important phase of the company's business. *Heating equipment is our lifeline, not a side line.*

That's why Winkler Dealers have utmost confidence in their Franchise as a *protected and enduring asset!* It is likewise a *growing* asset—the Winkler line of automatic heating products is now so comprehensive that virtually every type of buyer can be reached.

Winkler Training Schools develop men for lasting success

What better evidence of company stability than the Winkler Training Institute? These training schools represent a substantial investment—established solely to help Winkler Dealers profit fully from their Franchise. Enrollment is free to Winkler Dealers and their personnel.

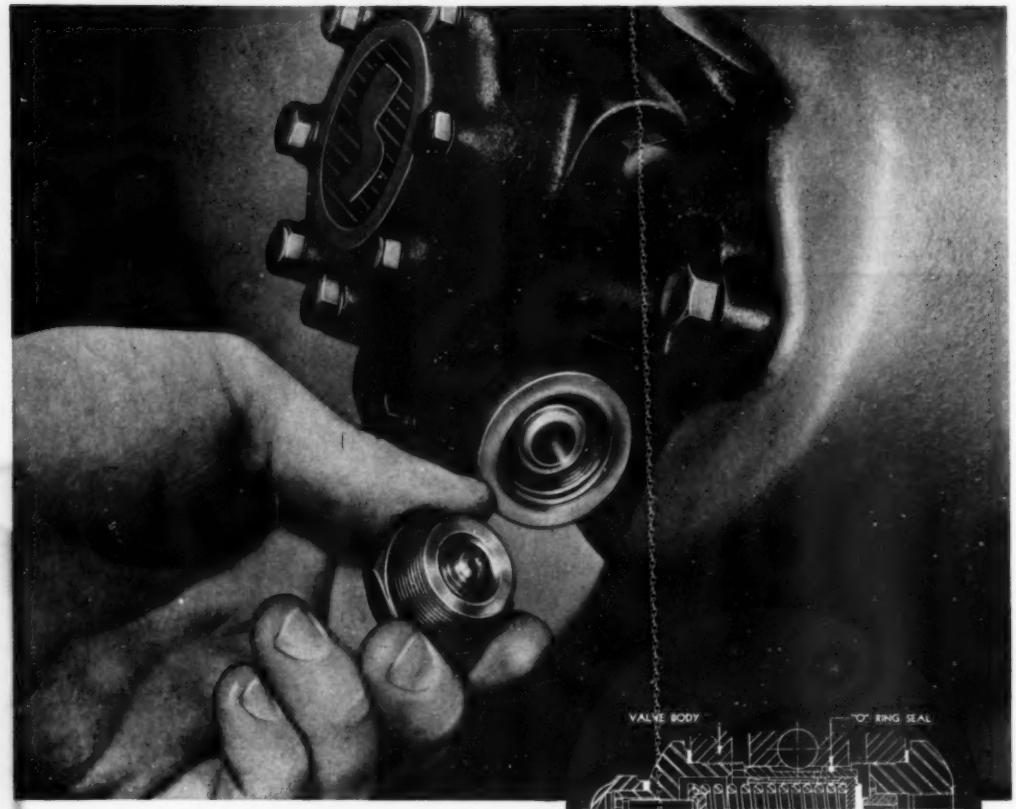
The Winkler "Safeguarded Business Opportunity" is open in some territories. Write today for information.

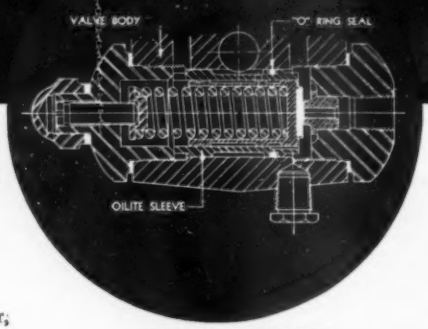
WINKLER

AUTOMATIC HEATING EQUIPMENT

U. S. MACHINE CORPORATION
Dept. A-101, Lebanon, Indiana

• ANOTHER REASON WHY SUNDSTRAND IS *FIRST* IN FUEL UNITS •





"Balanced" valve, free from pulsation is quickly, easily serviced on the job!

You can service or replace the complete Sundstrand valve assembly *without removing the unit from the burner!* Moreover, you can adjust the pressure from 75 to 150 psi by just removing a cap and turning a screw. In operation, the improved valve is "tops". You get quiet, clean, smokeless starts—less sooting. It gives you quicker, cleaner, smoke-free cut-off. All pressure binding has been eliminated. Three by-pass ports, equally spaced around outside of piston, distribute pressure relief *equally*, eliminating eccentric load on piston. The result—a *balanced* valve free from pulsation even on systems with high lifts or long lines.

Get Bulletin AA-10:

ASSURES FAST, CLEAN CUT-OFF . . . UNIFORM PRESSURE

Incorporating latest principles in hydraulic design, this Sundstrand Valve is precision manufactured from selected materials for utmost satisfaction on the job.

SUNDSTRAND

Made in Canada by John Inglis, Ltd., 14 Strachen Ave., Toronto

SUNDSTRAND FUEL UNITS

SUNDSTRAND MACHINE TOOL CO.
HYDRAULIC DIVISION, ROCKFORD, ILL.

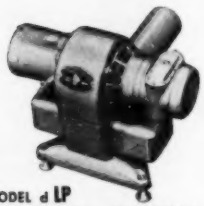
Satisfy All Customer-Heating Needs

WITH THE *Combustioneer*® LINE OF PRODUCTS

Weigh the Selling Features! They're what pay you profits in any line of heating equipment. Combustioneer has them . . . exclusive features with powerful sales appeal. Look at them, displayed and described here. Then decide that YOU want them . . . let Combustioneer make *easier and faster sales,* for *YOU,* in YOUR business!

AMAZINGLY DIFFERENT—COMBUSTIONEER

LOW PRESSURE OIL BURNER



MODEL d LP

Exclusive "HYDRA-VATED" (hydraulically motivated) low pressure oil pump—variable capacity from .60 to 3.0 gph.—no extra pump needed for outside tank installation—capacity changed with "flip of a finger" while burner is operating. Exclusive "Flo-Mist" nozzle guaranteed clog proof for 15 years. Triple Velocity Visorhead provides and controls secondary air. Only Combustioneer has a free floating "HYDRA-VATED" piston to meter the oil.

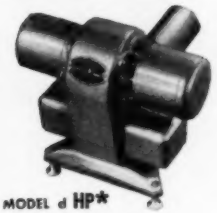
COMBUSTIONEER GAS AND OIL FURNACES

(GAS) 85,000 TO 150,000 BTU INPUT

(OIL) 119,000 TO 245,000 BTU INPUT

Designed for maximum efficiency. Heavy *10* and *12* gauge steel heat exchangers, *20* gauge steel cabinets. Slip joint construction. Die-rounded corners. Two doors for blower access. Multi-jet gas or high or low pressure interchangeable oil burners, stainless steel Combustioneer Humidifier. Platinum blue finish.

COMBUSTIONEER HIGH PRESSURE* OIL BURNER



MODEL d HP*

The "peer" among oil burners. Exclusive Combustioneer Triple-Velocity Visorhead. Straight line air delivery. Factory wired two unit safety control. Whisper quiet operation. Can be installed in most all types of furnaces or boilers. Optional in all Combustioneer Oil Furnaces. Interchangeable from high to low pressure.

COMBUSTIONEER CONVERSION GAS BURNER

CAPACITY—
50,000 TO 225,000 BTU

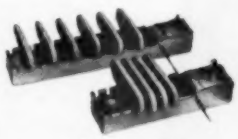
Exclusive *Triple-Mix* burner head—a single port burner has telescopic venturi and windbox for installation in most boilers or furnaces. No refractory. All operating controls compactly mounted in *20 gauge* platinum blue finished cabinet. 3 ways better: Triple mixing of gas and air; Flat horizontal air suspended flame; Hot gases "scrub" all exposed heating surfaces.

COMBUSTIONEER BITUMINOUS COAL STOKERS

CAPACITIES
7½ TO 1100 LBS. PER HOUR

Complete automatic air control with the dependable hydraulic-pneumatic Respirator, which operates without flappers, diaphragms, dampers or shutters in the air duct. Pulsating Gear Drive, which keeps fire-bed poked-up and free-burning. Hopper and bin-feed models. Bin worm sections up to 16 feet with no moving parts under the coal.

COMBUSTIONEER HUMIDIFIERS



EASILY INSTALLED
IN MOST WARM AIR FURNACES

Combustioneer has the exclusive *dual valves,* which are constantly submerged in water for dependable operation without clogging, rusting or corroding. Stainless steel pan which can't corrode. Thick ceramic plates assure free evaporation at all times. Standard equipment on Combustioneer Oil, Gas, and All-Fuel Furnaces.

Write or wire—obtain complete details about Combustioneer selling features. Valuable dealerships open on a direct, factory-to-you-basis.
We have openings for top-notch territory sales managers.

COMBUSTIONEER DIVISION
THE STEEL PRODUCTS ENGINEERING COMPANY
1290 West Columbia St., Springfield, Ohio
Manufacturers of Heating Equipment since 1928

Combustioneer GAS BURNERS • HIGH AND LOW PRESSURE OIL BURNERS
COAL-GAS-OIL FURNACES • STOKERS • HUMIDIFIERS

BECO indicator switches

Finger tip control for Home—Office—School—Factory or General Assembly.

The complete line of BECO indicator switches and parts are now available from a central source of supply.

One or more station controls, with multiple gang switches ready for immediate assembly from our stock component parts.

BECO switches come with or without lights, on single, double or multiple plates, either in plastic or metal, with a wide variety of nameplates, materials and plate designs.

A special relay to use with our 24 volt circuit.

Easy to follow wiring diagram packaged with each switch.

Write today for your (free) catalog on the versatile—dependable—economical BECO indicator switch.

BURKE ENGINEERING CO.

1937 South Burlington, Los Angeles 7, California

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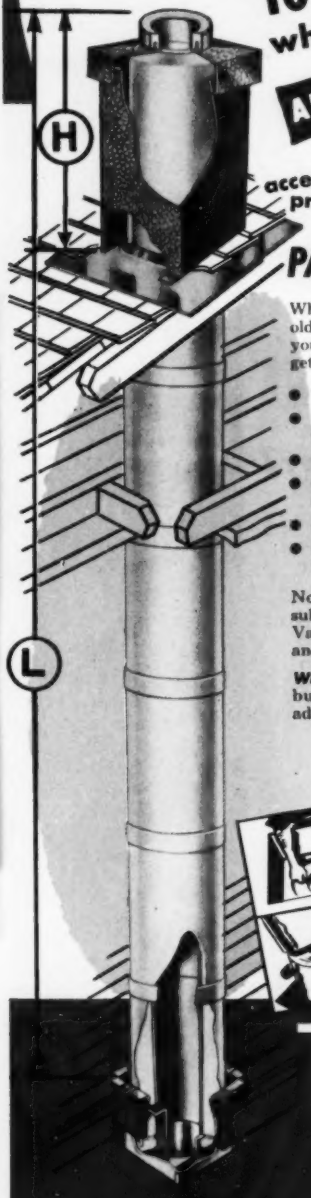
CENTURY'S
44 UNITS
Can make money
for you every day!
★ The dealer who sells from a complete line of Automatic Gas/Oil Heating Equipment closes more sales . . . makes more money!
★ Write Today! Some choice territories are open — let us tell you how you can build greater profits with an exclusive CENTURY franchise.
CENTURY ENGINEERING CORPORATION
CEDAR RAPIDS, IOWA
CENTURY
The Finest in Automatic Heating Equipment

Why GIVE THE CHIMNEY SALE AND INSTALLATION TO SOMEONE ELSE when you can ADD BUSINESS MAKE PROFIT with

accepted proved **Van-Packer PACKAGED CHIMNEY**



Why hire somebody to build chimneys the expensive, old fashioned way when you can install Van-Packer yourself—saving time and money. And, your buyer gets a more efficient, longer-lasting chimney.

- **You install Van-Packer at *exact moment* it suits you best**
- **Each package contains complete supplies—nothing else to buy**
- **Finish chimney installation in 3 hours or less**
- **Cut chimney cost from 20% to 50%—eliminate waiting and cleanup mess**
- **Accepted by FHA and national codes**
- **Proved fire-safe and efficient by Underwriters' Laboratories**

Now you can sell and install the chimney, too—add substantial sales volume and profit. When you install Van-Packer you can also guarantee heater performance more positively, eliminate customer complaints.

WHERE DO I BUY IT—See your heating supply or building materials jobber or write direct to address below.

HOW DO I INSTALL IT

Install and level chimney base in floor or ceiling. Cement sections together—apply draw bands. Fit housing to exact roof pitch. Set rain cap. You are all done in 3 man-hours or less.

Van-Packer CORPORATION

A FEW OF THE MANY BUILDERS CUTTING COSTS WITH VAN-PACKER CHIMNEYS

Robert Bartlett Bldg. Corp.

H. B. Layne, Contractor

Strausman Construction Co.

Lawrence C. Pearce Co.

Private Homes, Inc.

why sell just "furnaces"—
when you can sell *Shirtsleeve Comfort*

Oh, man!—how's this for a picture of *Shirtsleeve Comfort?* Pretty solid, isn't it?

Mister, that's what you've got to sell—*what will sell for you!*—when you handle Ingersoll Heating Equipment. That's because *Shirtsleeve Comfort* is engineered right into all Ingersoll units.

Whether for gas, oil or coal, gravity or forced air, big job or little, every Ingersoll unit is designed and built for better performance, longer life, lasting comfort. And there's a model and size for practically every warm air heating need.

To help speed your sales and profits, there's a big array of hard-hitting sales and advertising helps, cooperative ad plan, factory engineering assistance on the tough jobs. *Plus* the reputation of Ingersoll and Borg-Warner for finest quality products to back you up all the way.

So why sell just "furnaces" when you can really go places with *Shirtsleeve Comfort*—against any kind of competition! Mail that coupon down in the corner for all the interesting details.

DISTRIBUTORS —DEALERS!
Mail coupon for details

© 1951 INGERSOLL PRODUCTS DIVISION

Ingersoll
HEATING EQUIPMENT
for Shirtsleeve Comfort

ENGINEERING BW PRODUCTION

INGERSOLL PRODUCTS DIVISION
Borg-Warner Corporation
Kalamazoo, Michigan

GAS

OIL

COAL

OIL BURNERS

GAS CONVERSION BURNERS

INGERSOLL PRODUCTS DIV., *Borg-Warner Corp.*
Dept. AA-6 Kalamazoo, Michigan
We're interested! Rush literature and details for:
☐ Franchise Distributorship ☐ Dealer
Send us literature, too!
☐ Architect ☐ Contractor
NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____

Can Type 430 Substitute for Type 302?

Government restrictions are taking the popular 18-8 chromium-nickel stainless steels "out of the game" for many non-defense uses.

In selecting an alternate stainless steel for their work, many sheet metal men have turned to Armco 17 (Type 430)—a chromium grade.

To help you determine whether or not Type 430 is suitable for the jobs you get, we have just published a new folder listing satisfactory and unsatisfactory uses. Ask your nearest Armco Distributor for a copy.

In fabrication, Type 430 is not as ductile as Type 302. However, with slight changes in practice, many difficult forming and drawing operations can be done on the chromium grade. Where welding is involved, Armco Type 430 Ti (a titanium modification) provides much more ductile welds than regular Type 430.

These and other fabricating problems are covered in detail in another new bulletin, "How to Fabricate Type 430 Stainless Steel." Your nearby Armco Distributor will be glad to give you a copy.

ARMCO STEEL CORPORATION

4561 CURTIS STREET, MIDDLETOWN, OHIO • PLANTS AND SALES OFFICES FROM COAST TO COAST • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

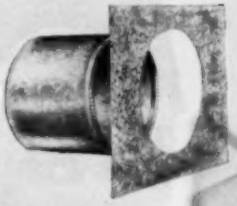
NIAGARA

FOR YOUR DEFENSE PRODUCTION

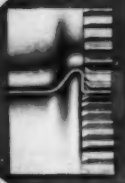
ROTARY MACHINES for SHEET METAL WORK

BEADING
CRIMPING
ELBOW EDGING
BURRING
TURNING
FURNACE COLLAR EDGING
WIRING
FLANGING
SETTING DOWN
SEAMING
SLITTING
SPECIAL

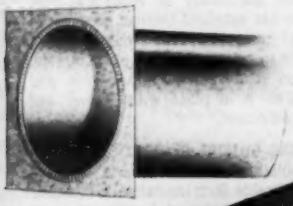
NEW FURNACE COLLAR EDGING ROLLS



Pipe Edged and Crimped



No. 164 Universal Rotary Machine with Furnace Collar Edging Rolls



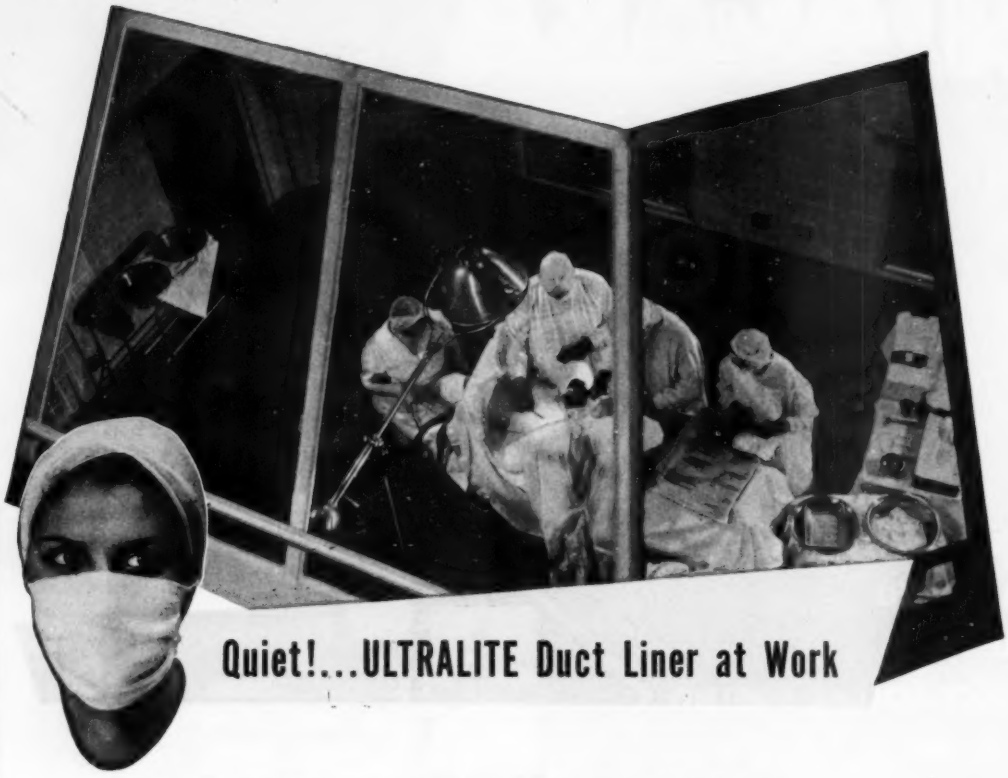
Pipe inserted and hammered flat

Write for Bulletins 75 and 85

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

America's Most Complete Line Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK



Quiet!...ULTRALITE Duct Liner at Work

What a difference a few feet of Ultralite Duct Liner can make in heating and air conditioning systems! For Ultralite's long glass fibers soak up objectionable sound, reduce "fan chatter" to a w-h-i-s-p-e-r. With just a few feet of Ultralite in the plenum and supply ducts, heating and air conditioning systems can operate at peak efficiency without disturbing anyone. It costs so little to make sure "the job is right;" try Ultralite on your very next job!

ULTRALITE is the duct liner that **won't burn**—a flexible, resilient, semi-rigid glass fiber insulation designed specifically as acoustical duct liner. (It also has excellent thermal properties.) Ultralite Duct Liner won't break, flake, or chip, won't delaminate, won't flake off in air stream. You can run it quickly around curves and corners, fasten it in place with screws and washers or adhesives.

FOR WRAPPING OUTSIDE OF DUCTS, use Ultralite Duct Insulation—it's as simple as wrapping a package! Ultralite Duct Insulation is available plain or with your choice of 4 different vapor barrier facings. Use coupon for more details.

GUSTIN-BACON ULTRALITE INSULATION MANUFACTURING CO.

GUSTIN-BACON MFG. CO.

1412 WEST 12TH ST., KANSAS CITY, MO.

New York Chicago Philadelphia San Francisco Los Angeles Houston Tulsa Ft. Worth

HP-10

Please send me ULTRALITE Duct Liner and Duct Insulation samples, specifications, and catalog A.I.A. File No. 37-D-2.

Name_____

Company_____

Address_____

City_____ State_____

Chicago Warm Air Golf

THE 1951 SEASON of the Chicago Warm Air Golf Association ended with a fine tournament at Ruth Lake Country Club, Hinsdale, Ill., on September 25. Mel Jackson, Grant Wilson, Inc., arranged and conducted the tournaments held during the summer. Those present at Ruth Lake voted to carry on in 1952 and to set up a regular association program of three meets per year. Mr. Jackson will again head the group.

George Andersen, Condensation Engineering Corp., had the lowest net score total for the tournaments held this past summer and won the association's season cup. The day's winners were Carl W. Johnson, Jr., C. A. Woodruff Co., Lester L. Solstad, Austin Sheet Metal Works; G. G. Fohey, A. O. Smith Corp.; Joe Cambal, American Radiator & Standard Sanitary Corp.; Will Pennington, Dole Valve Co.; Harry Himelblau, Himelblau Associates, Inc.; Paul Sirovatka, Subert Heating Co.; Vernon H. Joy, Republic Metals; and Howard Maccubbin, Crise Controls.

Blind Bogey winners were Gil Ruston, American-Standard and Wayne Limbert, Condensation Engineering Corp. The non-golfers' prize was won by R. S. Singer, Dole Valve Co.

New York

DATES FOR the 1952 convention of the New York State Sheet Metal, Roofing and Air Conditioning Contractors Association have been announced. Meetings are to be held in the Ten Eyck Hotel, Albany on Feb. 10-13, 1952. Clarence Meyer, Buffalo, secretary of the association is making plans from a program of interest and importance.

Michigan

THE SHEET METAL CONTRACTORS association of Michigan recently lost one of its oldest and most valuable members when R. N. White died on Aug. 26. Mr. White had served the association in many capacities including the office of president. According to N. J. Biddle, secretary of the group, he seldom missed a meeting of the association though he was badly crippled by arthritis in his later years.

In connection with the recent controversy over regulation of natural gas, Mr. Biddle, representing the association, wrote to the state public service commission urging that the commission certify that it was in full control of the natural gas supply and intended to remain in control.

COMING EVENTS

Oct. 15-17—American Gas Association, 33rd annual Convention, Kiel Auditorium, St. Louis, Mo. American Gas Association, 420 Lexington Ave., New York 17, N. Y.

Nov. 5-8—7th All-Industry Refrigeration and Air Conditioning Exposition, Navy Pier, Chicago, Ill. Sponsored by Refrigeration Equipment Manufacturers Association. George E. Mills, Show Director, 1346 Connecticut Ave. N. W., Washington, D. C.

Dec. 3-4—National Heating Wholesalers' Association, Annual Meeting, Hotel Statler, Cleveland, Ohio. E. L. Wyman, Executive Secretary, 609 Commerce Building, Cleveland.

Dec. 5-6—National Warm Air Heating and Air Conditioning Association, 38th Annual Convention, Hotel Cleveland, Cleveland, Ohio. George Boeddener, Managing Director, 145 Public Square, Cleveland.

Feb. 7-8, 1952—Sheet Metal and Warm Air Heating Contractor's Association of Indiana, 34th Annual Convention, Hotel Severin, Indianapolis. Frank E. Anderson, Secretary, 439 S. 17th St., Terre Haute.

Feb. 11-13, 1952—New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association, Annual Convention. Ten Eyck Hotel, Albany. Clarence Meyer, Secretary, 567 Genesee St., Buffalo, N. Y.

April 21-23, 1952—Sheet Metal Contractors Association of Illinois, Annual Convention. Abraham Lincoln Hotel and Exhibit at Elks Club, Springfield. E. A. Schmidt, 1210 E. Laurel St., Springfield.

EQUIPMENT DEVELOPMENTS

Non-Metallic Structural Sheets

RESOLITE CORP., Zelienople, Pa., has begun manufacture of shatterproof translucent structural panels of polyester resins reinforced with fiberglas mat.

Available in six colors these semitransparent sheets are particularly effective in skylighting. No special skylight framing is needed since sheets fit with metal or asbestos cement sheets and fasten in the same manner. Also adaptable for use in partitioning corridors, offices, shower stalls, and for marquee, porch and patio covering, bar facing, lighting panels, etc.

Ordinary tools and skills are used in installation. Panels are unaffected by heat, cold, or moisture, and colors are stable. AA 127

Above: Non-Metallic Sheets
Right: Gravity Gas Furnace

Gravity Gas Furnace

SURFACE COMBUSTION CORP., Toledo, Ohio, introduces a compact gravity furnace of 125,000 Btu input. It features a new, fast responding burner, high thermostat sensitivity, and glass wool insulation in jacket for heat saving. Engineering emphasis is placed on faster circulation and quieter operation. Furnace is easily and quickly assembly. AA 128

Fuel Oil Additive

SHELL CHEMICAL CORP., New York, N.Y. A new fuel oil additive which practically eliminates filter screen clogging in domestic fuel oil burners is now on the market. Product is noncorrosive and easy to use. Fewer shutdowns due to smudge and tarry deposits afford savings in repair and emergency service. AA 129

Self-Expanding Screw Anchors

MASTERCRAFT PRODUCTS, Jamaica, N. Y., has produced a light weight, tough, and practically indestructable screw anchor which will withstand extremes of temperature and is not affected by atmospheric conditions.

These self-expanding anchors are used for fastening in all types of solid materials such as brick, wood, concrete, glass, metal, and bakelite. They are self-setting, self-threading, and self-locking.

Low in price and easy to use, these anchors are available for all screw sizes. Over size screws up to four sizes larger than the corresponding anchor can be safely applied. AA 130

Above: Small Blower-Filter Unit
Left: Plastic Screw Anchors

Small Blower-Filter Unit

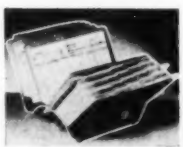
VIKING AIR CONDITIONING CORP., Cleveland, Ohio, has introduced a small blower-filter unit that was developed specifically for houses of 7,000 cu ft or less and now heated with gravity furnaces.

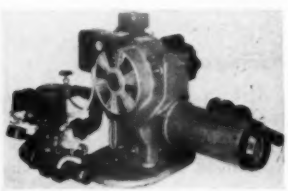
This unit may be attached to furnaces rated up to 42,000 Btu capacity. Rheostat selector permits operation at required speed without mechanical adjustment. A turn of the knob provides from 250 to 700 cfm. Equipped with a 1/10 hp motor which may be varied from 650 to 1100 rpm. Has standard 400 sq in. filter. AA 131

Card Service Record System

DIEBOLD, INC., Canton, Ohio, has devised a new card system for keeping records on units serviced. The same card can be used for inventory control, service control and history, as a sales record, and a prospect record.

Housed in a handy desk tray, the cards can be quickly removed or adjusted. An automatic V makes each record fully readable without removing it. Records are punched with three keyhole slots and mounted on a bar in the desk tray. Up to 810 records can be filed in each tray and the tray can be easily moved from one place to another. AA 132





Above: Record System
Right: Gas-Oil Burner

Combination Gas-Oil Burners

CLEAVER-BROOKS CO., Milwaukee, Wis., has introduced a line of combination heavy oil and gas burners for use

Coupon on this page

where natural gas is available to industry on an interruptable or curtailable basis.

The burners are designed with a forced draft system which provides combustion air for both oil and gas, assuring high operating efficiency under all atmospheric conditions.

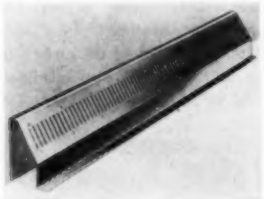
Burners can be regulated to burn the required amount of oil or gas and can burn either fuel, independently of the other. Full modulation between high and low fire is available in two of the larger sizes.

These burners are equipped with electronic controls which guarantee safe operation.

Models range from 720,000 to 8,700,000 Btu gas input. Changeover from one fuel to another is quickly accomplished. AA 133

Perimeter Baseboard Registers

STANDARD STAMPING AND PERFORATING CO., Chicago, Ill., have developed two new models of perimeter baseboard registers. Available in four foot sections. Each section has individually operated sliding damper control that can be adjusted easily for minimum, medium, or maximum air volume. Registers are fabricated of 20 gauge steel and finished in prime coat, special finishes upon request. AA 134



Above: Baseboard Register

Right: Gravity Oil Furnace

Gravity Oil Furnace

ARMSTRONG FURNACE CO., Columbus, Ohio, has just announced a gravity oil furnace, oil fired and rated at 100,000 Btu per hour at the bonnet.

The D4 gun type oil burner used incorporates a turbo regulator combining control of quantity and turbulation of primary air to assure high efficiency firing.

The furnace is readily converted to gas firing. A conversion kit is available for this. The Btu rate for gas is 135,000 per hour input with the same bonnet output as oil.

Where a converted gravity coal furnace is being replaced and the existing gun type oil burner is in good condition this furnace can be installed using the same burner. AA 135

Compressed Air Line Filter

AIR-LINE ENGINEERING CO., Cleveland, Ohio, has announced a compressed air line filter and condenser offering a new approach to the problem of removing water and oil from air lines.

A steel outer shell 6 in. in diameter and 36 in. long and a steel inner cartridge 5 in. in diameter by 24 in. long are loosely packed with fiberglas. Cast aluminum head with inlet and outlet openings is bolted to a flange welded to the outer shell. Air enters inlet opening and passes down between inner and outer shells. Condensed moisture falls to bottom of outer shell where it is discharged through drain valve. Air then passes through fiberglas in inner cartridge which baffles out remaining moisture without reducing pressure in the line. Fiberglas is non-absorbent and long lasting consequently no servicing is required on filter except frequent draining of accumulated water and oil. AA 136

Above: Screw Vise
Left: Air Line Filter

Screw Vice for Irregular Objects

DE WILDE-JONES, INC., San Francisco, Calif. A new screw vise which easily locks tapered, round, or irregular objects is now in production.

Vice jaws consist of a series of machined and ground flat plates which hinge or swivel in any desired direction to adjust to shape of object held. They can also be

For Your Convenience to Cut Out and Mail

We will ask the manufacturer to send full particulars about the equipment and literature described.

Be sure to circle the items for which you wish complete information

10-51

127 128 129 130 131 132 133 134 135 136 137 138 139
140 141 142 143 144 145 146 147 148
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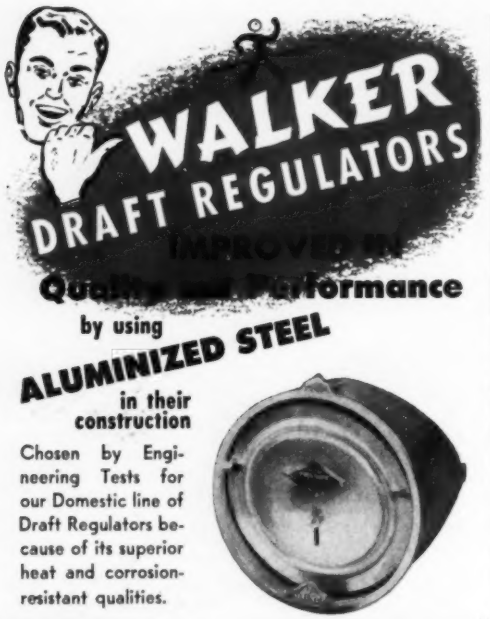
City ..... Zone ..... State .....

Mail to AMERICAN ARTISAN, 6. N. Michigan Ave., Chicago 2, Ill.


WALKER
DRAFT REGULATORS
IMPROVED IN
Quality and Performance
by using
ALUMINIZED STEEL
in their
construction
Chosen by Engineering Tests for our Domestic line of Draft Regulators because of its superior heat and corrosion-resistant qualities.
WALKER offers 2 types of Draft Regulators with Tee Joints featuring the new friction-free Box Hinge.
348 Economy Tee Joint
COMMERCIAL and INDUSTRIAL
(Ball Bearing) Built to meet toughest conditions. Size 16" to 36".
Millions of heaters require Draft Regulator replacements. You can take advantage of this enormous market or improve the performance of installations you make by using Walker Regulators. Pipe sizes 3" to 36".
5 Good Reasons why you should make WALKER FUEL SAVERS standard equipment.
1 — They are tops in adjustment and sensitivity.
2 — They save on every type of fuel.
3 — Easily installed and neat in appearance.
4 — The new Box Hinge insures long life and positive action.
5 — Because of enormous volume, Walker prices are especially attractive.
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1717 Penn St.
St. Joseph, Missouri
WALKER
DRAFT REGULATORS
THE WORLD'S LARGEST DRAFT CONTROLS FACTORY

Coupon on page **103**

moved in relation to each other and the workpiece rests on a contact surface underneath. By turning a main screw the locking jaws position themselves and can then be locked to retain their position. Tightening screw requires only a slight turn without imposing a heavy torque, to tightly grip object.

Precision ground Swedish steel is used for vise jaws. Distance between jaws is 2-½ and 5 in. respectively in two sizes. AA 137

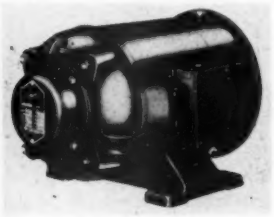
Arc Drive Control for Rectifier Welders

WESTINGHOUSE ELECTRIC CORP., Pittsburgh, Pa., has developed a new arc drive control to produce electrical transient characteristics desirable for certain welding operations now available on Type RA selenium rectifier welders.

The drive permits the operator to adjust the arc characteristic of the welder to suit a particular job. This device operates automatically and instantaneously to provide an extra surge of current at the moment the arc becomes shorted, helps clear its path, and prevents arc outage or sticking of the electrode.

Amount of arc drive desired can be set by the operator. Adjustment of the control is not critical. It has an off position for use when the machine is to be used short circuited on low resistance loads for any appreciable length of time, such as resistance heating.

A self-heating thermostat is provided in the circuit to protect the arc drive from overheating due to sustained short circuit of the welding terminals. AA 138



Above: Integral HP Motor
Left: Arc Drive Control

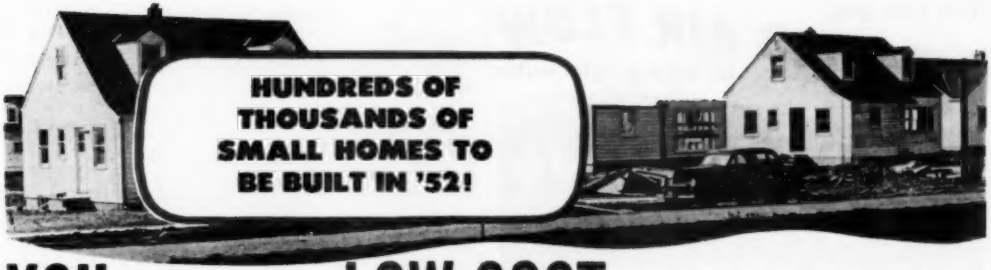
NEMA C Face Mounted Integral Horsepower Motors

KINGSTON-CONLEY DIV., Hoover Co., North Plainfield, N.J., announces a new line of integral horsepower motors. These units are offered in single phase, integral ratings through 3 hp, 3450 rpm, and in polyphase, integral ratings through 5 hp, 3450 rpm, built in NEMA standard frames.

Two basic varieties are available, horizontal with a mounting base, and vertical without a mounting base but equipped with a canopy. Both are dripproof, equipped with heavy duty ball bearings, and suitable for continuous duty operation on applications where vertical operation is required.

Special features on single phase units include a totally

(*Continued on page* 106)



YOU need this LOW-COST Oil Burner in your Line-up to Capture YOUR share of this Business

Designed specifically for the Low-Cost Small Home Market

Automatic heating for small homes!—That's the key to sales NOW! Builders, developers, faced with the problem of holding down costs on small homes are demanding the best possible heating unit at the lowest cost. AND THAT'S THE EXCLUSIVE KRESNO-STAMM *P.A.G. "BALL FLAME" OIL BURNER!—the oil burner unit engineered specifically for top performance in fractional gallon firing rates up to one gallon.

Kresno-Stamm promotion is reaching large-scale builders across the country. YOUR customers are being pre-sold on "Ball Flame." Follow up *fast* and close the business!

For larger homes—the Kresno-Stamm POW-R-MATIC Gun Type Oil Burner is a leader!

KRESNO-STAMM
*Pressurized Air Gravity
"BALL FLAME"
Reg. U. S. Pat. Off.
OIL BURNER

*P.A.G. "BALL FLAME" is featured in leading furnace lines!

HERE'S WHAT MAKES THE *P.A.G. "BALL FLAME" the hottest thing in small-home heating *TODAY*:

1. *A compact unit, complete with all equipment* — firing assembly; automatic safety float oil valve; mechanical forced draft blower unit with slow-speed motor mounted on rubber for silent operation; specially engineered heat-resistant flame spreader.
2. *Exclusively designed for inexpensive furnace installation.* Does not require refactory combustion chamber. Does not require stack relay. Easily adapted and installed in all types of furnaces—Hi Boy, Gravity, Counterflow, Utility, and Floor Furnace. Easily built to manufacturers' specifications for production line assembly.
3. 1/3 fuel saving below 1 gallon consumption as compared to gun type.
4. Trouble-free. No costly service calls. Replacements of parts are few and inexpensive.

50% **CHEAPER TO BUY—TO INSTALL! That's why more and more builders and developers are turning to "Ball Flame" automatic oil burners for small homes. On a 100 unit development, you can pocket as much as $10,000 on the cost of the entire heating system.**

WRITE NOW FOR FULL DETAILS ON "BALL FLAME" HEATING FOR SMALL HOMES.

KRESNO-STAMM

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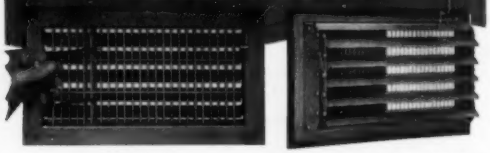
You can get
DIRECTED AIR FLOW
at any angle with

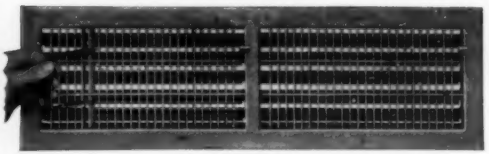
INDEPENDENT
"Fabrikated"
REG. U. S. PAT. OFFICE
AIR CONDITIONING
REGISTERS



321-A HMV

Rear View Showing "HMV" Valves

Every grille bar adjustable individually—before or after installation



321-A HMV Tandem

Any direction of air flow—right, left, up, down and any combination—is easily obtained with "Fabrikated" Style No. 321-A HMV air conditioning registers, for residence or commercial installations, on sidewalls or ceiling. The face bars are adjustable to right or left; valves on the back are adjustable to direct the air flow up or down; valves may also be fully closed, and are connected to open or close in unison.

The angles of deflection and the combinations to be had are practically unlimited. Adjustments for directed air flow may be made before or after installation. Grille bars are held firmly in place and will not vibrate or rattle.

"Fabrikated" registers are available in sizes from 8 x 4" to 48 x 24", including tandem style. Special sizes can be made without special die set-up charges.

Write for Catalog No. 50.

Always Leading—Always Progressing

THE INDEPENDENT REGISTER CO.
3747 E. 93rd STREET · CLEVELAND, OHIO

Coupon on page 103

enclosed dust proof, dirt proof, external switch housing, and condensers mounted within the motor base to minimize in-transit and handling damage. AA 139

Sheet Metal Saw

BETT-MARR MFG. CO., Hopkins, Minn., has developed a sheet metal saw designed to cut stacked galvanized sheet metal (50 sheets or more) at speeds up to 15 in. per minute. Cuts ductwork fittings to a fraction of the time required by hand.

A powerful chain drive gear allows full power at slow speeds for faster and cleaner cutting and eliminates blade chatter. Speed range from 125 fpm to 2200 fpm gives quick selection of correct blade speed for material to be cut. Takes blades up to and including ½ in. width. Smooth table size 20 x 22 in. is adequate for large work.

Set of four sheet metal clamps and riser bar insert to match included for sheet metal work. AA 140

Sheet Metal Band Saw

Gas-Oil Unit

Oil and Gas Fired Air Conditioning Units

J. L. GILLEN CO., Detroit, Mich. A series of new interchangeable oil and gas fired winter air conditioning furnaces in capacities from 80,000 to 125,000 Btu's are now available.

The oil fired unit incorporates a flange mounted pressure atomizing gun type burner while the gas fired unit is equipped with a single port, fountain type gas burner. Burner being mounted on a single plate allows easy access for installation and servicing. Large centrifugal type blowers with adjustable motor pulleys allowing for continuous air circulation are standard equipment.

Furnaces are 26 in. wide, 54 in. long and 52 in. high with base and top assembly finished in bronze hammertone and body panels finished in gold hammertone. AA 141

Two Speed Furnace Fan Control

CRISE CONTROLS DIV., Acro Mfg. Co., Columbus, Ohio, has developed a two speed furnace fan control (FAF-15) for use on gas, oil, or coal fired warm air heating equipment. Separate electrical circuits have individual SPDT switches. When furnace bonnet temperature rises to the low speed fan setting, the fan starts operating at this speed and will switch to high speed only when

(*Continued on page* 108)

Buy the Furnace thats sure to work right!
The RHEEM FIRE-TESTED
Automatic Gas Furnace
Rheem
R
What do you want in the gas furnace you buy? Automatic operation, of course. But more important, you want the best dollar for dollar value, and full assurance of long-lasting, trouble-free satisfaction.
You get all this with a Rheem Gas Furnace. Because every Rheem Gas Furnace is FIRE-TESTED—given a 48-point inspection with gas and controls hooked up and burners ignited. The automatic controls are tested . . . operation and construction details are checked . . . every assurance is made that every Rheem Furnace works 100% right!
And when a Rheem quality-built Gas Furnace leaves the factory it is completely assembled. Your dealer can install it in your home quickly, without fuss or bother—ready to give you immediate, luxurious winter comfort. For the finest in automatic gas heating, see your local Rheem heating dealer now.
You can rely on Rheem
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Please send me your FREE illustrated booklet that tells what to look for in selecting an automatic water heater.
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Rheem Advertising Sells Reliability

...in dramatic, colorful ads that stop readers!

In October, the new Rheem selling theme: "FIRE-TESTED" is being introduced in consumer magazine advertisements. It's the story of the longer-lasting, trouble-free satisfaction your customers get from reliable Rheem Gas Furnaces.

In November, the "FIRE-TESTED" theme is being presented in the striking, colorful advertisement you see here. Millions of readers of national magazines such as *Better Homes & Gardens, American Home,* and *Time* cannot help but be attracted by this dramatic, convincing story of Rheem's greater dollar for dollar value.

You must know from experience that the facts this Rheem advertising presents are the very thing furnace prospects are looking for today. Automatic operation they take for granted. "What's my best furnace buy?" is what they want to know.

This Rheem advertising will pre-sell your customers. Prove to them – and yourself – that "You can rely on Rheem" by backing up the Rheem "FIRE-TESTED" story when prospects come into your store. You'll find that closing Rheem Gas Furnace sales is easy!

Rheem Manufacturing Co.

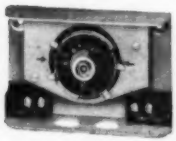
Specialists in GAS Heating Equipment

570 LEXINGTON AVENUE, NEW YORK 22, N.Y.

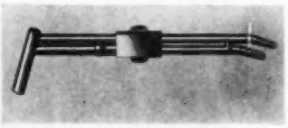
Coupon on page **103**

bonnet temperature reaches the higher setting. Action reverses as bonnet temperature falls.

This unit features visible scale settings and temperature indication. It has a bimetal helix temperature element made in lengths up to 18 in. Available either with or without swivel mounting. AA 142



Two Speed Fan Control



Soldering-Brazing Torch

Soldering-Brazing Torch

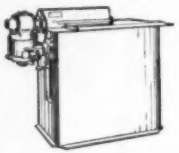
MASS COMPANY, Davenport, Iowa. An all purpose soldering brazing torch with built-in thumb control regulating gas and air volume is now in production. Flame can be adjusted from needle point to pencil size and will produce up to 2500 degrees of heat. Natural, artificial or bottled gas can be used. Torch can be attached to an air compressor or breath blown.

Ideal for sheet metal work, it also can be used either as a production tool or a portable torch on job operations. Torch is made of brass tubing, is 11-½ in. long and weighs approximately 10 ounces. May be used for hardening drills and drill bushings. AA 143

Steel Measuring Tape

MASTER RULE MFG. CO., INC., Middletown, N.Y. A self-locking steel measuring tape can be used in poorly lighted or hard to reach places without danger of the measurement slipping.

Features include four scales (graduations on both edges of both sides), pistol butt case and decimal equivalent chart, as well as a slip proof lock. Can be used for inside or outside measure, height or depth gauge, outside caliper measure, or turned over so graduations are flush for layout work. Easily readable black print on white tape. Comes in 6, 8, and 10 ft lengths. AA 144



Above: Measuring Tape
Right: Slitting Machine

Sheet Metal Slitting Machine

R. H. PETERSON SHEET METAL CO., Hayward, Calif. A small compact sheet metal slitting machine capable of cutting 16 gauge material to the center of 36 in. sheet at the rate of 68 ft per minute is designed primarily for small sheet metal shops but can be used wherever a quantity of straight slitting is done and there is insufficient room for a 10 ft power shear.

(*Continued on page* 110)

Save this information for your REFERENCE FILE!

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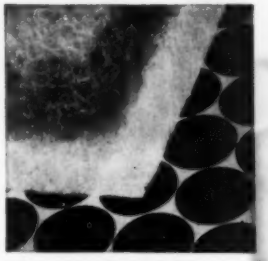
GLASS FIBER DISPOSABLE AIR FILTERS

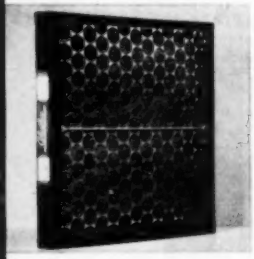
...the best, most complete, most profitable line on the market

A COMPLETE LINE . . . FOR ALL FORCED AIR HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS

GLASFLOSS I-S FILTER

For peak air cleaning efficiency, the GLASFLOSS I-S Air Filter Unit is the answer. Here a strainer mat has been added to the famous long, glass fibers that make up the standard GLASFLOSS Air Filter pad. The combination brings air filtering efficiency to as high as 95%. No other air filter on the market can compare.





GLASFLOSS STANDARD FILTER

This is the conventional type — the filter most in demand. The long, fine glass fibers provide a greater surface area to catch and hold more dust with less air resistance. The Glasfloss STANDARD Filter is primarily intended for home heating equipment and normal industrial installations. Available in all standard sizes.

GLASFLOSS ROLL-PAK

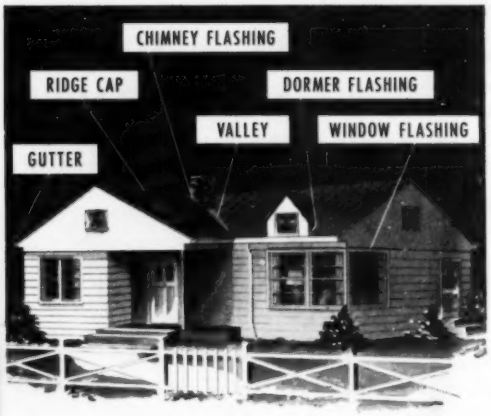
Here is a product carefully planned for bulk users. Cut your own filter pads—fit them into your own frames and save, with every change, as much as 30% of your air filter costs. Available in rolls, 40″ wide and 10′ long and in 1″ and 2″ thickness. Application is easy. Just roll it out, cut to size and put into position. The fluffy, fine fibers are easy on the hands.

For Complete details on any product in the GLASFLOSS Line, write Dept. AA-10

Glasfloss 155 EAST 44th STREET, NEW YORK 17, N. Y.

BIG profits here
...WHEN YOU INSTALL

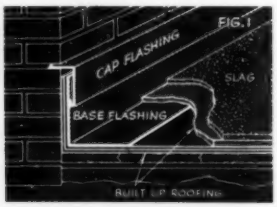
FOLLANSBEE SEAMLESS TERNE METAL



Yes, every flashing, valley and conductor in modern housing is another big opportunity for you to make a nice profit by installing Follansbee Seamless Terne Metal. Builders and home owners get maximum weathersealing protection. *You* get customer satisfaction and acceptance that's sure to lead to more and better weathersealing jobs on new construction and repair contracts.

Show samples of Follansbee Terne Metal to architects and engineers. Tell them about the *lifetime durability* of Follansbee Terne Metal for weathersealing and roof decks, many of which have been in service more than a half-century. And don't forget that industrial and commercial buildings need weathersealing too.

There's a distributor nearby who can supply you with 50-ft. continuous rolls of Follansbee Seamless Terne Metal. Think of him when you make your regular check-up on roof maintenance contracts.



An easy method for maintaining a perfect seal using Terne Metal for wall, parapet or chimney flashing when composition roofing is laid on a wood deck. For further suggestions on how to use Terne Metal for permanent, profitable weathersealing, write us.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

POLISHED BLUE SHEETS AND STRIP — SEAMLESS TERNE ROLL ROOFING
COLD ROLLED STRIP

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, St. Louis, Kansas City, Nashville, Houston, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Plants*—Follansbee, West Virginia

FOLLANSBEE METAL WAREHOUSES
Pittsburgh, Pa. — Rochester, N.Y. — Fairfield, Conn.

Coupon on page **103**

Blades of slitter pull material through machine and since adjustment for width is done by moving cutter head with gauge remaining stationary, material can be stacked on gauge line and different widths cut without moving material.

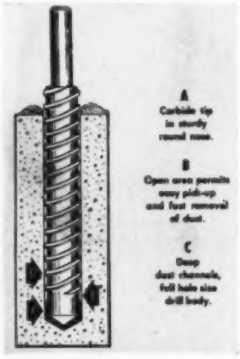
Bearings throughout are either oilite or ball bearing with lubricant sealed in. Motor is ¾ hp, 110-220 v, single phase, with control switch and overload cutout. AA 145

Carbide Tipped Masonry Drill

SUPER TOOL CO., Detroit, Mich., has designed a new masonry drill machined from solid steel with a round nose supporting a carbide tip.

Ample dust clearance is provided without weakening the end that does the work. It also reduces the chance of cracked or weakened tips due to brazing strains. Double lead fast spiral dust grooves are made extra deep for long life.

Holes up to 12 in. deep can be drilled without removing drill from hole. Drill body is the same as nominal size of drill and wide lands serve to guide it in producing a clean and perfect hole. AA 146


A
Carbide tip in sturdy round nose.
B
Open area permits easy pick-up and fast removal of dust.
C
Deep dust channels, full hole size drill body.

Above: Calibrated Card Simplifies Input Adjustment

Left: Solid Steel, Carbide Tipped Masonry Drill

Adjustment Card for Gas Input

ROBERTS-GORDON APPLIANCE CORP., Buffalo, N.Y., has issued a card to assist installers in quick adjustment of patented iris orifice for required input. Double tag shipped with each unit devotes one half to diagrammatic instructions and other half to calibrated card labeled cubic feet per hour.

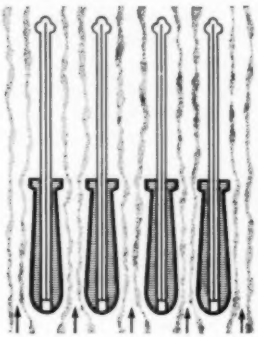
Installer places card between bell and wrench so calibrated curve matches air shutter. Wrench is next moved to input desired. Chart provided on reverse side computes input after timing revolution of test hand on meter as check on calibrated card setting. AA 147

Portable Dehumidifier

FRIGIDAIRE DIV., General Motors Corp., Dayton, Ohio, offers a rectangular electric dehumidifier unit capable of reducing humidity in an area up to 8,000 cu ft. Light and easily moved, it is 18¼ in. high, 20 in. long, and 11¾ in. wide. Controlled by a simple off and on switch it can be plugged into any 115 volt wall outlet. AA 148

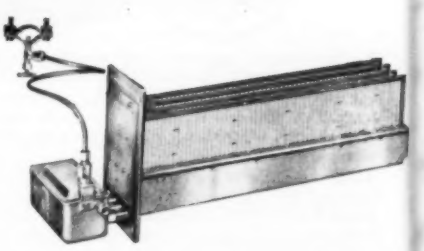
EXCLUSIVE!

HERE'S THE "INSIDE STORY"



60% less air restriction in the plenum! The diagram above shows why. There's no old-fashioned flat-bottom pan to choke off the flow of warm air. Heated air flows past Maid-O'-Mist's streamlined water troughs with an absolute minimum of friction and restriction. Yet, by putting every square inch of the evaporator pads to work, 30% MORE humidity-making area is provided. No wonder Maid-O'-Mist design is so ideal for modern warm air furnaces with their small plenums.

Only Maid-O'-Mist Convector Humidifiers assure the free flow of heated air between evaporator pads . . . so vital in modern small plenum furnaces!



And check these other big Maid-O'-Mist advantages

- 50% less installation time. Just cut opening in plenum, attach plenum flange frame, slip in factory assembled unit and make water connections. That's all.
- For vertical or sloping bonnet furnaces.
- A size for every home . . . every furnace. Humidity-making capacities of 1 to 10 gallons per day. A range of 13 sizes to choose from.
- Non-ferrous metals throughout. Trouble free automatic supply valves.

Get full information from your Jobber, or write for Bulletin 701B

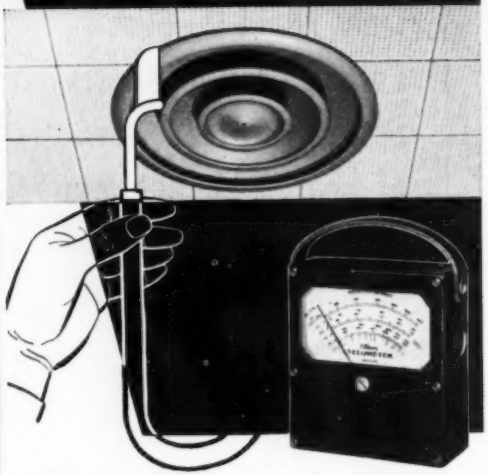
MAID-O-MIST Inc.
HEATING SPECIALTIES

AUTOMATIC HUMIDIFIERS . . . . . AUTO-VENTS
WATER LINE CONTROLS . HEATING SPECIALTIES

MAID-O'-MIST, Inc.

3217 NORTH PULASKI ROAD . CHICAGO 41, ILL.

Alnor
VELOMETER
Recommended by BARBER-COLMAN for Precision Air-Flow Readings



Barber-Colman engineered air distribution products are designed to meet the exacting needs of architects, engineers, and owners.

Proper installation is the all-important final step that assures uniform air distribution equal to design performance.

Alnor Velometers are recommended by this manufacturer for precision air-flow readings on all installations. They have determined in their own laboratory and by field tests that the Alnor Velometer provides a fast and convenient way of checking air velocities and air-flow conditions.

The Velometer is the *only* instantaneous, direct-reading air velocity meter—accurate in all ranges, from high to low—compact, portable, easy to understand and use. Wide assortment of jets and fittings makes this precision instrument ideally suited for all velocity measurement.

For your air measurement needs—get an Alnor Velometer—you'll be glad you did. Use this coupon for Barber-Colman installation manual.

ILLINOIS TESTING LABORATORIES, INC.
Room 538, 420 N. LaSalle St.
Chicago 10, Ill.
☐ Send Barber-Colman Manual
☐ Have Alnor Representative call.

Name.....
Company.....
Address.....
City.....State.....

Alnor PRECISION INSTRUMENTS FOR EVERY INDUSTRY

NEW LITERATURE

Coupon on page 103

Electronic Heat Control Stuffer

MINNEAPOLIS-HONEYWELL REGULATOR CO., Minneapolis, Minn. An electronic thermostat developed after seven years of research is described in a consumer booklet.

The new super thermostat is part of an electronic control system which measures heating needs from outdoors as well as indoors, operating the burner in timed cycles to maintain an even level of warmth. This offsets the tendency of some heating systems to alternate between too hot or too cold.

The thermostat has no moving parts to wear out or require adjustment and is 100 times more sensitive than the human body to temperatures. AA 321

Portable Workshop on Wheels

ALLEGHENY BODY CO., INC., Philadelphia, Pa., has prepared illustrated circulars on several models of truck bodies that are especially adapted for use in the heating, sheet metal, and service field.

Designated as portable workshops, these truck bodies are built to fit chassis from ½ to 1½ tons capacity. Drawers, shelving, tarpaulin covers, ladder rack, vises, rear platform extensions, etc. are examples of the wide range of optional equipment available to suit individual needs. Loading space of the ½ ton model is maintained at 48 by 72 in., indicating the compact arrangement of auxilliary equipment. AA 322

Stainless Steel Alternates of the 18-8 Series

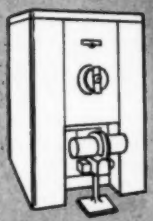
REPUBLIC STEEL CORP., Cleveland, Ohio. A Guide to Type 430 Stainless Steels as Alternates of the 18-8 Series is the title of a booklet recently released to assist users affected by defense restrictions on chromium-nickel stainless steel.

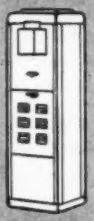
The data concerns type 430 stainless steel (containing no nickel) in comparison to types 302 and 304 (containing nickel and now restricted) and describes performance of type 430 under corrosive conditions and the mechanical properties related to high temperature usage. Drawing, forming, welding, and polishing are discussed at length with comparisons noted. This guide will be helpful to fabricators who are unable to obtain high priority chromium-nickel stainless steel. AA 323

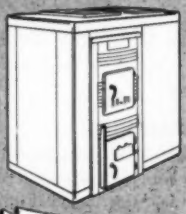
Canadian and Export Catalog

KRESNO-STAMM MFG. CO., Palisades Park, N. J. has published a complete catalog of oil burners, gas burners, furnaces, and all types of heating accessories for the Canadian and export trade. Included are many nationally advertised brands. The catalog was developed to make available at one source all equipment, accessories, fittings, and instruments required for the installation and service of heating equipment. AA 324

(*Continued on page* 114)







You KEEP the PROFIT you make on ARMSTRONG FURNACES

If you want to see a manufacturing-pricing-merchandising setup that will plug the holes through which dealer profit so often goes down the drain, look over the Armstrong proposition.

Complete line? Certainly—gas, oil and coal—but that isn't enough. Good markup? Of course—but *that* isn't enough. You have to have *all* of the elements to make a profit *which stays in your pocket!*

With Armstrong you've got them. A distribution system which avoids the profit-drain of heavy inventory, yet puts the heating plant you need right in your back yard. Installation simplicity which gives you *profit*, not top-heavy cost. Performance which wins friends. Construction which holds customer goodwill over the years. And beauty which helps at a glance.

Right down the line, the Armstrong picture invites critical inspection. Look at it from every angle—product, policy, merchandising assistance, profit-possibilities. If you're a progressive, vigorous dealer who can recognize an honest profit, call your nearby Armstrong distributor, or drop us a card for his name.

Wherever you are

YOU'RE ON THE ARMSTRONG MAP . . . IN A STRATEGIC LOCATION

Armstrong's two large plants serve both sides of the continent quickly, economically. A warehousing distributor, with a complete Armstrong inventory, is within a stone's throw of everywhere. Wherever you are, Armstrong's distribution system is set up to serve you. It's better, quicker, more profitable . . . for you.

Please address Dept. AA at our plant nearest you.

ARMSTRONG
FURNACE COMPANY

COLUMBUS, OHIO — **DES MOINES, IOWA**

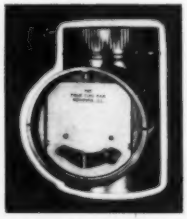
Warm-Air Furnaces—Gas, Oil, Coal—A Complete Line

CONTROLLED DRAFT BY
field
BAROMETRIC CONTROLS

...the only draft control that's nationally advertised to your customers

field TYPE M

First and finest for all types of automatic heating plants.



field TYPE R and "SCOTTY"

First and finest for all types of space heaters and ranges.

field BAROCHEK

First and finest for hand-fired furnaces and boilers, a combination check damper and draft control.

field RNA-W

First and finest for automatic water heaters.

field CONTROL DIVISION
H. D. CONKEY & CO., MENDOTA, ILL.
AFFILIATES:
Conco Building Products, Inc.
Brick · Tile · Stone
Conco Materials Handling Division
Cranes · Hoists

Coupon on page 103

Metal Paint Primer

RUSTICIDE PRODUCTS CO., Cleveland, Ohio. A new four page folder tells how a metal primer applied by brush directly over rusted surfaces stops rust and primes metal for paint. It is only necessary to remove loose scale with a wire brush before applying.

When applied to rusted surfaces this phosphate chromate primer causes iron oxide (rust) to chemically change to iron phosphate, an inert, hard, dark gray substance. After the primer is applied and has dried overnight, rust action is stopped and paint will bond tightly.

Savings in cost realized by use of this primer are partially due to elimination of the need to remove rust from a surface. It also cuts preparation time. Equally effective for exterior and interior work. AA 325

Nickel Alloy Resistance Welding

INTERNATIONAL NICKEL CO., INC., New York, N.Y., has issued a new technical booklet on resistance welding of nickel and high nickel alloys.

Drawings and photographs illustrate this 32 page bulletin (T-33). Tables on mechanical properties, chemical compositions, recommended conditions for welding, etc. are included. Sections are devoted to spot, projection, seam, and flash welding, and to resistance brazing procedure and equipment considerations. AA 326

Fan and Blower Catalog

CHELSEA FAN & BLOWER CO., INC., Plainfield, N.J., offers a new looseleaf fan and blower catalog including ventilation guides prepared by the Propeller Fan Manufacturer's Association.

The equipment section contains literature and prices of fans and blowers, complete with specifications and suggested applications.

The PFMA guides serve as reference for industrial and residential ventilation and contain information covering a variety of applications. AA 327

Air Distribution for TV Studio

BARBER-COLMAN CO., Rockford, Ill., has issued Bulletin F 4712 which discusses air distribution in television studios. The folder is illustrated with actual installations and describes a wide variety of air distribution equipment.

Air distribution outlets solve the problem of introducing large volumes of air at low noise levels and with flexibility of adjustment made necessary by scenery, properties, and other obstructions in a television studio.

The application of recessed and surface outlets in square, round, and linear shape are discussed, including outlets to meet the requirements of reception, sponsor, and control rooms, offices and utility areas. AA 328

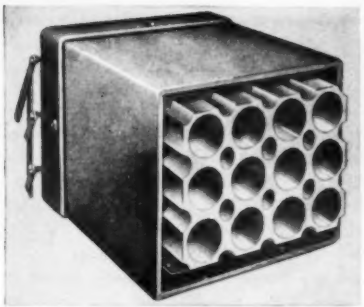
Binocular Magnifier

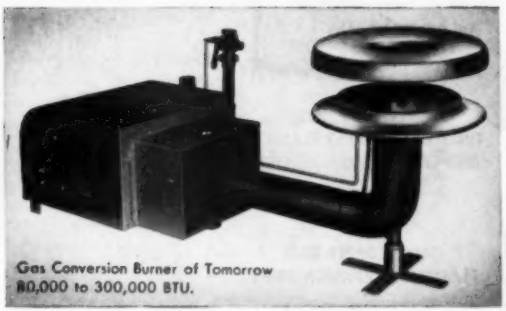
EDROY PRODUCTS CO., New York, N.Y., offers a fully illustrated folder describing a new binocular magnifier.

(*Continued on page* 116)

TRULIRADIANT

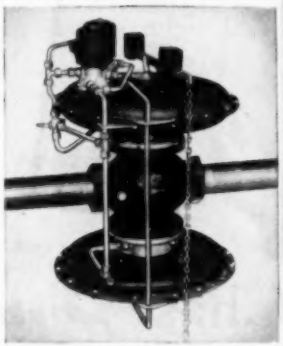
DELUXE BURNERS and CONTROLS FOR EVERY JOB





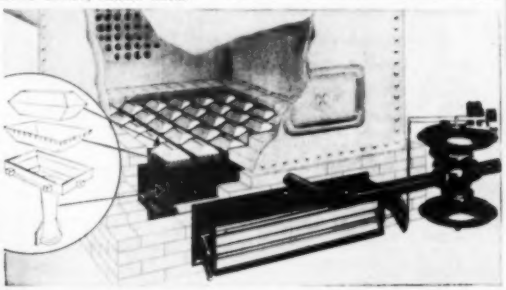
Gas Conversion Burner of Tomorrow
80,000 to 300,000 BTU.

Horizontal Gas Burner (above) for some types of commercial and industrial installations. Oil standby can be built into burner. Capacity unlimited.



Demandtrol Hi-Low Gas Valve is an electrically controlled gas operated diaphragm valve for use on gas-fired boiler and furnace installations. It features automatic control of the gas and air supply to the burners. With Demandtrol on the job, your gas burner will always operate at its most efficient stage . . . at "High fire" for peak demands, and thrifty "Low fire" when demands are less. Demandtrol prevents excessive feeding of gas to a cold boiler, by restricting fuel flow until furnace temperature and stack draft are established.

TRULIRADIANT Gas Burner (lower right) provides peak combustion efficiency in boilers and furnaces. Features include short, silent interlaced 45° flame, clog-proof burner ports and venturi, "emerald-shape" insulfractories and integral-pilot burners. The Burner is adaptable to all sizes and types of installations. Capacity unlimited.



The special Air Louver Box, complete with "Fail Safe" feature, provides the proper proportion of secondary air for peak combustion efficiency.

Some territories still open.
Write for information.

SULLIVAN

VALVE & ENGINEERING CO.

30 North LaSalle Street, Chicago 2, Illinois
1400 East Second Street, Butte, Montana
4124 Long Beach Avenue, E., Los Angeles 58, Calif.

2 NEW CHASE FLASHING PRODUCTS YOU'LL WANT TO KNOW ABOUT

CHASE ONE PIECE THRU-WALL COPPER FLASHING AND CAP FLASHING RECEIVER

Here are two new Chase Flashing products that will help you do a better job, faster.

The unique full weight copper Thru-Wall Flashing bonds in *all* directions. It has an integral cap flashing receiver that permits the easy installation of cap flashing *after* the base flashing and roof are installed. No wedges are needed to keep the receiver open.

CHASE COPPER BASE FLASHING EXPANSION JOINT

The new patented Chase Copper Base Flashing Expansion Joint now makes copper base flashing even more efficient. Failure of the copper due to expansion and contraction is prevented, since these joints absorb such movement in the base flashing.

FREE FOLDERS
Send coupon below for free folders on both of these new Chase Products.

Chase BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

Albany†	Cleveland	Kansas City, Mo.	New York	San Francisco
Atlanta	Dallas	Los Angeles	Philadelphia	Seattle
Baltimore	Denver†	Milwaukee	Pittsburgh	Waterbury
Boston	Detroit	Minneapolis	Providence	(Sales office only)
Chicago	Houston†	Newark	Rochester†	
Cincinnati	Indianapolis	New Orleans	St. Louis	

CHASE 150 YEARS

Chase Brass & Copper Co.
Dept. AA1051, Waterbury 20, Conn.
Please send me free descriptive literature on
☐ Chase Thru-Wall Copper Flashing and Cap Flashing Receiver.
☐ Chase Copper Base Flashing Expansion Joint.
Name_____ Position_____
Firm_____
Address_____
City_____ State_____

Coupon on page **103**

Made of light weight plastic it enlarges objects several times and is held in place over the eyes by an adjustable headband.

The magnifier is useful in mechanical trades because it leaves both hands free for work. Small parts or objects may be inspected, adjusted, or repaired with greater precision.

It reduces eyestrain and relaxes the user, increasing accuracy and minimizing chance of errors or accidents. AA 329

800 Series Perimeter Line

EXCELSIOR STEEL FURNACE CO., Chicago, Ill., presents a new line of fittings designed for use in perimeter heating systems.

A complete list of fittings and applications with prices (sheet PH-1) is obtainable on request. AA 330

Aluminum by Electric Reduction Process

REYNOLDS METALS CO., Louisville, Ky., has prepared a three color, 16 page booklet on production of aluminum pig in its Jones Mill, Arkansas, plant explaining the electric reduction process for producing aluminum from alumina and picturing equipment.

A new production line recently placed in operation is housed in two new 800 foot long buildings. With this addition total plant capacity has been increased to 194 million pounds of aluminum yearly. A generator plant has capacity of 1,730,000 kilowatt hours daily making it one of largest in the world. AA 331

Newspaper Mat Service

WAYNE HOME EQUIPMENT CO., INC., Fort Wayne, Ind. Illustrations of more than 50 newspaper ads covering a range of home equipment including gas and oil burners and furnaces are available. This newspaper ad mat service has been created to identify dealers with the lines and stimulate inquiries.

Selection of sizes can be made from the illustrations. Layout is such that they may be run as they are or cut and inserted as part of a dealer's larger ads. AA 332

Blower Bearing and Bracket

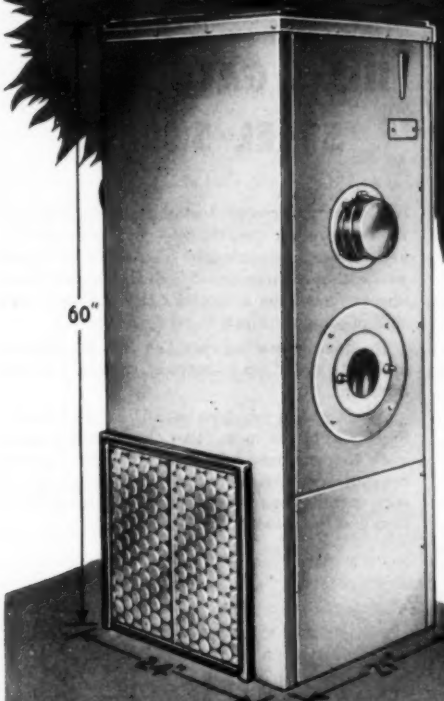
VIKING AIR CONDITIONING CORP., Cleveland, Ohio, presents a folder giving design characteristics and application data of a new blower bearing which is adaptable to any discharge position. Blower assembly can be mounted to provide horizontal, angular, upblast or downblast discharge in any style furnace. The bearing retainer can be easily rotated to keep the oiling slot on top.

Other features include removable design for easy servicing, a simple process for oiling, and self-aligning bearings which prevent misalignment due to rought handling in shipment. Spring and cushion washer mounting of blower shaft minimizes noisy end play and facilitates wheel clearance adjustment. Sound absorbent cushion washer is composed of neoprene and cork. AA 333

(*Continued on page* 119)

Kaustline Offers

Low Cost Housing for 4 out of 5 Homes



There is a Kaustline Winter Air Conditioner for every type of home.

● It is estimated that four out of five homes built this year will be in the low priced bracket. They now have the "green light" in the building picture. Here's a tremendous market for dealers who push the new Kaustline "Jersey 75" automatic forced warm air furnace. The Kaustline "Jersey 75" can be "lost" in the corner of even a small utility room . . . only 3½ square feet of floor space are needed. Because it is completely production-assembled at the factory, Kaustline is able to include quality features with its very competitive price tag.

The "Jersey 75" is designed to bring you greater profits from low cost housing. We are still able to supply a 275 gallon fuel tank with every unit. Write for complete information. Dept. AO.

THE STORY IN A NUTSHELL

75,000 BTU's • 3½ sq. ft. of floor space • Chrome Steel Fire Pot Liner • Fully Automatic Controls • Shipped "Ready to Install" Weight 324 lbs.

KAUSTINE QUALITY SERVICE SATISFACTION

Kaustline

Modulated Warm Air Furnaces from 65,000 to 270,000 B. T. U.—Septic Tanks—Pressure Vessels—Oil and Gasoline Storage Tanks—Truck Tanks—Custom Built Fabricated Equipment

on big jobs like this

(and small ones, too)

back up your workmanship with high-quality

U·S·S GALVANIZED STEEL SHEETS

Satisfactory ductwork installations, regardless of their size, require two things—good workmanship and top-quality materials. You can't do a good job without both. In U·S·S Galvanized Steel Sheets, you have a material that backs up the skill of your workmen in every respect.

Its fine fabricating qualities . . . its superior ability to stand up in service . . . are a matter of record.

As a result, a job done with U·S·S Galvanized Steel Sheets has more than clean, neat appearance to recommend it. Long life and superior resistance to corrosion are inseparable benefits of such installations that assure customer satisfaction and build more business for you.

IRON AND STEEL
SCRAP is a
VITAL DEFENSE MATERIAL
LET'S GET IT TO THE MILLS
IT MEANS MONEY FOR YOU
MORE STEEL FOR AMERICA

Thousands of feet of U·S·S Galvanized Steel Sheets go into the heating and air conditioning ductwork of this large office building.

COLUMBIA STEEL COMPANY, SAN FRANCISCO • TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM • UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

GALVANIZED STEEL SHEETS

1-965

UNITED STATES STEEL

Coupon on page **103**

Air Filter Sizes

OWENS-CORNING FIBERGLAS CORP., Toledo, Ohio. A 50 page revised booklet of air filter sizes for filter equipped warm air furnaces and blower units has just been published.

Included is alphabetical listing of 166 manufacturers of forced warm air heating equipment. Listed under the name of each are the sizes and number of filters needed for units manufactured by the company and the manufacturer's identification numbers.

The booklet is planned to simplify and speed ordering of air filters. AA 334

Fuel Oil Manual

INDUSTRIAL PRESS, New York, N.Y., announces publication of *Fuel Oil Manual* by Paul F. Schmidt. This treatise will be useful to those who buy, sell, or use fuel oil for heating, power generation, or industrial purposes.

The text gives complete data on the properties of fuel oil, including the limitations of each grade. In each case the author explains the meaning of each property and shows how the information can be applied in selecting, handling, and burning.

A special chapter is devoted to fuel oil treatment which gives the latest information on the properties and uses of various treatments, describes what an additive can and cannot do, and analyzes the essential qualities which should be considered in selecting an additive.

Another chapter lists 22 common fuel oil troubles and their symptoms, and shows the correct remedy to apply in each case.

The 160 page manual includes 34 tables. Price $3.50 per copy. AA 335

Replacement Parts for Burners and Stokers

SID HARVEY, INC., Valley Stream, N. Y., has assembled a fully illustrated catalog of new and rebuilt parts for gas and oil burners and stokers. Listed are parts for every oil burner, new or obsolete, found in the field today; gas contro equipment, such as diaphragm valves, thermocouples, pilots, etc.; stoker controls; and a complete line of accessories, tools, and instruments.

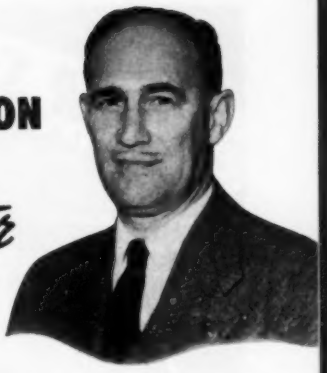
To aid comparison of specifications, prices, etc., similar parts made by different manufacturers are classified by function and grouped together. Thus all oil burner pumps are found in one section, regardless of manufacturer. This system applies to 29 general classifications.

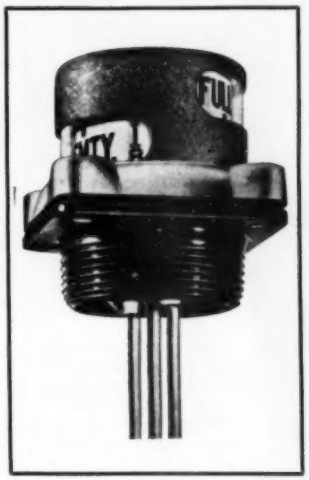
This catalog contains 226 pages and has about 1,500 illustrations. Single copies are available to readers by request on firm letterhead to the company direct at 104 E. Mineola Ave. Additional copies are priced at $2.50 each. AA 336

Arc Welding Booklet

HOBART BROTHERS CO., Troy, Ohio, offers a new pocket guide on arc welding. Booklet gives such information on metals and electrodes as four essentials of proper welding procedures, types of joints, typical positions,

"WE'RE SOLD ON *Rochester* GAUGES!"





"Rochester 'Dual-Dial' Oil Gauges have been our 'stand-by' for years. After long periods of use we find our records show no service charges for gauges. This means better customer relationships and economical operation."

Earl L. Kunkle

EARL L. KUNKLE
R. L. Stott Company
Oil Burner Sales
and Service
Philadelphia, Pa.

The R. L. Stott Co. has been serving three heavily populated Pennsylvania counties for over 25 years. Experience has sold them on the complete dependability and positive leak-proof feature of Rochester "Dual-Dial" Oil Tank Gauges. They know these gauges can't leak oil or vent fumes, even under pressure. As a result customers are satisfied. Costly service calls are eliminated. What's more the large, magnetically actuated "Dual-Dial" is easy to read from both front and back—indicates the oil level at a glance.

Ruggedly built, easy to install Rochester Gauges have been Underwriters' listed for over 25 years. Stocked by leading wholesalers for basement oil burner storage tanks in the following depths—22", 24", 27", 42", 44", and 47"; 1½" and 2" pipe thread connections. Special lengths to order . . . STOCK UP NOW. Rochester Manufacturing Co., Inc., 66 Rockwood Street, Rochester 10, New York.

ROCHESTER
MANUFACTURING COMPANY, INC.
DIAL THERMOMETERS GAUGES AMMETERS

ROCHESTER DEPENDABLE ACCURACY GAUGES

RCS SUPER SAW
AIR COOLED
Saves you more time than any other tool in your kit

A Journeyman's tool, built to stand up under constant, on-the-job Contractor or Industrial use.

★

Built-in Blower—Anti-friction replaceable bearings—No starting hole needed—Blades to cut all materials—Fits any heavy duty ¼" or ⅜" drill.

Super Saws and Blades are listed on Federal Supply Schedules, Class 40 Material.

Cutting opening in oak flooring in less than 3 minutes—no starting hole needed!

MAIL TODAY!

RCS TOOL SALES CORP.
JOLIET, ILLINOIS

Gentlemen:
Please send us Bulletin A-10 and name of the nearest Super Saw distributor.

Name_____

Address_____

City_____ Zone ____ State_____

Coupon on page **103**

standard steel shapes, characteristics of fillet weld, causes of common welding troubles, types and color marking for identification of electrodes and average electrode consumption. Instruction for using electrodes is also available in this handy reference guide. AA 337

Small Homes Council Circular

SMALL HOMES COUNCIL, University of Illinois, Urbana, Ill. Home heating advances of the last six years are revealed in a revision of the council's non-technical circular entitled Heating the Home, originally published in 1945. Since then a total of 117,000 copies of the first edition have been distributed.

Prominent attention is given to heating basementless houses which have grown tremendously in popularity since 1945. Perimeter warm air heating for slab floor, basementless houses has been tested and proved by the university's engineers.

The circular points out that "The efficiency of a heating system depends on correct installation and operation of properly chosen equipment," and that "the real cost is not just that of the original equipment, but is equal to the initial cost plus maintenance and fuel costs. A cheap heating system will cost more in the end than one properly designed and correctly installed."

Authors of the revised circular are Professors S. Konzo, W. S. Harris, and R. W. Roose, all members of the staff of the Engineering Experiment Station at Illinois, for 35 years a center of home heating research.

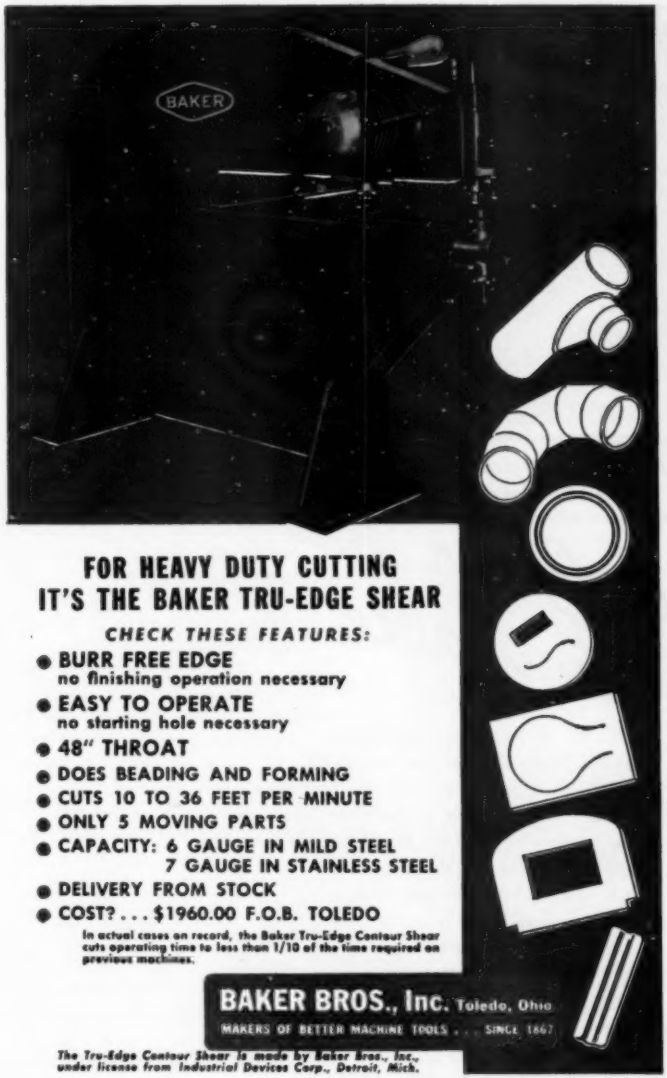
Single copies of Heating the Home can be secured without charge until November 1 by writing directly to the Small Homes Council. After that date, copies will be 10 cents each. AA 338

Oil Heating Promotion Kit

ARMSTRONG FURNACE CO., Columbus, Ohio. A complete sales promotion kit to assist heating dealers in the sale of oil fired equipment in territories where gas is restricted consists of a window display poster, a furnace display card, a broadside mailing piece, newspaper advertising mats, and recorded radio spot announcements. The campaign is based on the theme Beat the Gas Freeze. Specially designed gas burners have been developed to convert oil fired furnaces to burn gas and the new merchandising campaign helps heating dealers in the gas restricted areas sell his prospects on the idea of burning oil now, then converting to gas with one of the special burners when gas becomes available . AA 339

Metal Preservation and Paint Bonding Chemicals

AMERICAN CHEMICAL PAINT CO., Ambler, Pa. An eight page reference list of rust proofing, paint bonding and metal protective chemicals is available for fabricators of steel, zinc and aluminum products. The purpose, characteristics, advantages and effectiveness of various types of spray, dip and brush coating chemicals are briefly described and their applications to the commonly used industrial metals. AA 340



FOR HEAVY DUTY CUTTING
IT'S THE BAKER TRU-EDGE SHEAR

CHECK THESE FEATURES:

- **BURR FREE EDGE**
  no finishing operation necessary
- **EASY TO OPERATE**
  no starting hole necessary
- **48" THROAT**
- **DOES BEADING AND FORMING**
- **CUTS 10 TO 36 FEET PER MINUTE**
- **ONLY 5 MOVING PARTS**
- **CAPACITY: 6 GAUGE IN MILD STEEL**
  7 GAUGE IN STAINLESS STEEL
- **DELIVERY FROM STOCK**
- **COST? . . . $1960.00 F.O.B. TOLEDO**

In actual cases on record, the Baker Tru-Edge Contour Shear cuts operating time to less than 1/10 of the time required on previous machines.

BAKER BROS., Inc. Toledo, Ohio
MAKERS OF BETTER MACHINE TOOLS . . . SINCE 1867

The Tru-Edge Contour Shear is made by Baker Bros., Inc., under license from Industrial Devices Corp., Detroit, Mich.

TOPS!

THARCO — a secret formula Armstrong product . . . unduplicated, unmatched for ease of application and long-lasting, trouble-free results.

of Leading Contractors and Manufacturers

New Color Now Available

THARCO Asbestos Furnace Cement now comes in two colors: Black and Light Gray.

Many furnace men prefer this new Light Gray THARCO. They report it a cleaner furnace cement to handle, and that it makes for a neater finished job.

Both colors are packaged in sizes to meet all requirements — from one-pound cans to 350-pound drums. Your jobber can supply you promptly.

FREE Sample of either color THARCO is yours for the asking. Write us at Detroit for it today.

OTHER ARMSTRONG PRODUCTS

"33" Compound for wood or metal sash glazing

Steel Sash Putties

Wood Sash Putties

Rely-on Caulking Compound

TRADE MARK OF EXCEPTIONAL QUALITY

THE ARMSTRONG COMPANY

241 So. Paul St. Detroit 17 — 4063 So. LaSalle St. Chicago 9 — 2417 Swiss Ave. Dallas 1 — Richmond California

SALES SENSE

by Jack Bedford

SUBSTITUTE selling may become more and more important as time goes on, no one knows. But, if it does come into vogue the salesman who knows how to apply the right selling techniques for substitutes will hold his customers' good will, discover customers' real wants, point out the similarity of substitute, be frank and earnest, don't oversell customers, don't run down requested merchandise, these are the five rules that give Sales Sense to substitute selling.

$ $ $

Some salesmen expect to harvest sales the day after the seed is sown.

$ $ $

The garage mechanic told the traveling salesman, "Offhand, I'd say it's going to cost you plenty — and of course that's just an estimate."

$ $ $

Salesmen who show reliability are not counted as a liability.

$ $ $

Salesmen who want their dreams to come true shouldn't oversleep.

$ $ $

Then there was the businessman who didn't believe in advertising anywhere. Before long he didn't have any business to advertise.

$ $ $

Perfection may never be reached, but it is worth reaching for.

$ $ $

Salesmen who are crying wolf about merchandise shortages today to sell more may be crying because of the wolf tomorrow.

$ $ $

A sincere salesman inspires confidence in his prospect's mind because he believes in his firm, his product, and himself.

$ $ $

To err is only human, but when you wear out the eraser before you've used up the pencil, you are overdoing it.

$ $ $

Under present day inflation, I wonder if the five per centers will start charging ten per cent?

$ $ $

Price, they tell me, was once an indication of quality, but now it's an indication of nerve.

$ $ $

But, salesmen who use Sales Sense know that regardless of the price a sale can be completed if the sales presentation hits a live buying nerve . . . customers still want the things we are selling . . . if we are selling with Sales Sense.

My DUST STOP* filter sales are way up this fall!

This can be your experience this season, just as it is that of thousands of other alert dealers. The market for Fiberglas DUST-STOP* Filters has *grown* by 750,000 users since a year ago. Owens-Corning Fiberglas Corporation is running *full-page ads* in Better Homes & Gardens and American Home in October and November. And dealers are out *plugging* DUST-STOP Filters because they pay a sweet profit. No wonder you can make money on them. Owens-Corning Fiberglas Corporation, Dept. 35J, Nicholas Building, Toledo 1, Ohio.

Replace dirt-clogged furnace filters NOW!
It costs you less to change 'em twice a year than to forget 'em . . . even once!
FIBERGLAS DUST STOP
AIR FILTERS
Important Information
Better Homes and Gardens
AMERICAN HOME

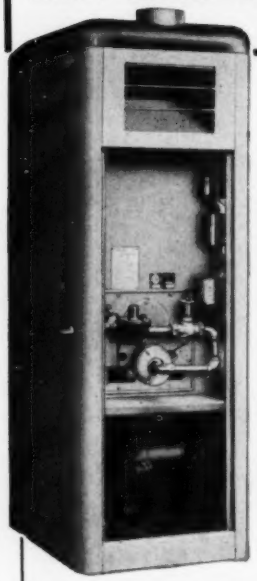
IT PAYS TO PROMOTE AND SELL THE ORIGINAL

OWENS CORNING FIBERGLAS DUST STOP

UL

*FIBERGLAS and DUST-STOP are trade-marks of Owens-Corning Fiberglas Corporation for products made of or with fibers of glass.

HI-BOY or LOW



handles any forced air problem

SECURITY

The remarkable new

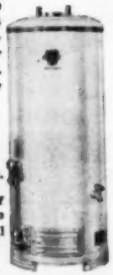
SECURITY

MODEL SFA FURNACE

Security leads the trend to compact efficiency with the new SFA Series. Adaptable to every domestic winter air conditioner situation. Versatile enough for conventional, basementless or utility room installations. Completely engineered for effortless, automatic heating. Yes, sir . . . the SFA brings greater economy and longer life to home heating!

Only Two Connections Necessary

Completely assembled at factory. Hook up just one gas and one power line! Filter racks optional at bottom, right or left. Each control can be removed without disturbing other wiring. You'll be amazed at its versatility. Available for all gases. Write or wire now for complete information, prices.



SECURITY MFG. CO.

1630 Oakland St., Kansas City 3, Mo.

Also manufacture the famous Security Heavy Duty Water Heater and full Line of Gravity, All Purpose, and In A Wall Furnaces and Conversion Burners.

INDUSTRY ITEMS

THE APPOINTMENT OF Harold A. Miller as general staff manager, general sales department of United States Steel Supply company, was announced by Paul C. Van Cleave, sales vice president of the warehousing subsidiary of U. S. Steel. Mr. Miller succeeds William C. Etheredge, who joins the price division of the commercial department of United States Steel company in Pittsburgh.

Mr. Miller first joined U. S. Steel subsidiaries in the sales personnel division of United States Steel company in Pittsburgh, in 1947. He came to Chicago in April, 1950, as sales personnel manager for the Supply company, the position he holds at the time of his present appointment.

Born in Lansing, Michigan, Mr. Miller received his A.B. degree from Antioch college, Yellow Springs, Ohio, in 1943. Prior to joining U. S. Steel, Mr. Miller was associate personnel director of Antioch.

IDWAL PARRI, field education director of the Perfex Corp., Milwaukee, Wis., is shown conducting the first of a series of distributor schools in Chicago at the Graemere Hotel. The schools are cooperative ventures between Perfex and their distributors. Classes are held three successive evenings from 7 to 10 p.m. The course covers fundamentals in electricity, actuating devices, control systems and field service problems. Props consist of colored and black and white films, text books, and demonstration boards.

Chicago Meeting

It is planned that succeeding schools will be held for small groups in the distributor's establishment where heating systems will be studied and actually worked on by students, dealers, and jobbers.

Important note at the closing of the first school was that several sales were written as a result of explanation of benefits derived from Perfex controls.

Gil Churchill and Al Rutherford, owner-partners of the Thermatic Corp., Perfex Chicago distributor, were pleased with the results of the school.

ANNOUNCEMENT HAS just been made by Leo J. Bachle, president of the N. O. Nelson Company, St. Louis, Missouri, of the purchase of the assets and merchandise of the Beall Bros. Supply Company at Alton, Illinois and Marion, Illinois.

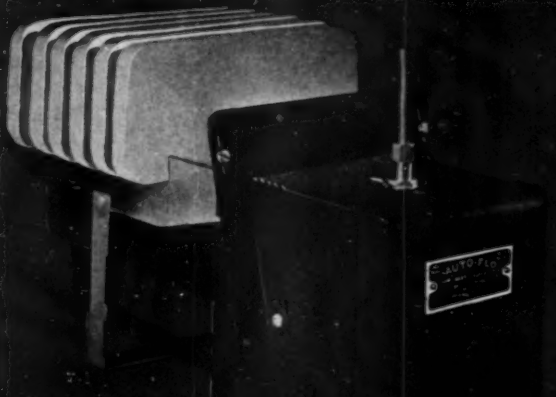
Both locations will operate under the Nelson name.

A New Principle of Operation

NO FLOAT!
NO DRIP!
NO CLOG!

NO MOVING PARTS TO ADJUST... STICK OR WEAR OUT!

FOR ... and LESS SERVICING

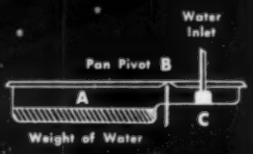


Patent Pending

Autoflo "100"

AUTOMATIC HUMIDIFIER

"Simple as ABC"



Features

- Easier Installation
- More Efficiency
- Less Maintenance
- Modern Design
- Longer Life
- Greater Satisfaction

UNCONDITIONAL FACTORY GUARANTEE ON ALL PARTS FOR ONE YEAR!

Order through your Local Jobber or Write, Wire or Call Us for further information —

*TRADE MARK

try
the
simpler
way—
just use
P-K
hardened
MASONRY NAILS

for making fastenings to
brick, mortar, concrete, etc.

You'll save work, as well as time and money by using P-K* Hardened Masonry Nails. Just hammer them in—they hold securely, and are easier, quicker, and cheaper to use than expansion bolts, lead anchors and plugs, and similar devices.

In comparatively soft masonry they can be driven without the necessity of drilling lead holes. For hard masonry, make pilot holes with a P-K Masonry Drill.

First time you try them, you'll agree that P-K Masonry Nails are the job-speeders you've been looking for. Available everywhere through accredited Distributors. Remember . . . IF IT'S P-K, IT'S O.K.

PARKER-KALON*
FASTENING DEVICES
Makers of the Original Self-tapping Screws

Write for this folder

Gives sizes, punch information, full instructions for use. Tells you the many ways Masonry Nails will help you save time and money. Parker-Kalon Corporation, 200 Varick Street, New York 14, N. Y.

*TRADE MARKS REG. U.S. PAT. OFF.

S. R. Griffin has been named manager at Alton, and I. C. Nelson, manager at Marion.

With the addition of the Alton and Marion branches, the Nelson company now operates 17 offices and warehouses in the states of Illinois, Missouri, Arkansas, Tennessee, Mississippi, Texas, Colorado, and Utah.

FRED R. GREEN, president of Des Moines Furnace & Stove Repair Co., Des Moines, Iowa, has announced the opening of a branch in Waterloo. The branch has been named Heating Wholesalers Co., and is located at 412 Chestnut St.

Burl Bishop is general manager of the new operation and Zelbert Johnson is in charge of the Warehouse. A complete stock of warm air furnaces, controls, and other equipment will be carried by the Waterloo company.

PERFECTION STOVE CO. is currently announcing three personnel changes in its Superfex furnace division. A. B. MacLaren becomes sales manager of the division; E. B. Goodwin will be new accounts manager; and E. W. Conners takes over the post of furnace service manager.

Mr. MacLaren came to Perfection in 1930 in a sales and service capacity. In 1935 he became layout engineer and sales and service correspondent, retaining this post until the start of World War II. During the war he had charge of Perfection's production engineering office and also handled contract terminations. He was named service manager when the war ended, and assistant sales manager of the furnace division in 1948.

A. B. MacLaren

E. B. Goodwin

E. W. Conners

Current plans calling for expansion of the company's Superfex furnace distribution make Mr. Goodwin's new position an important one. Coming to Perfection in 1934, he is well-known to distributors in the warm air heating field.

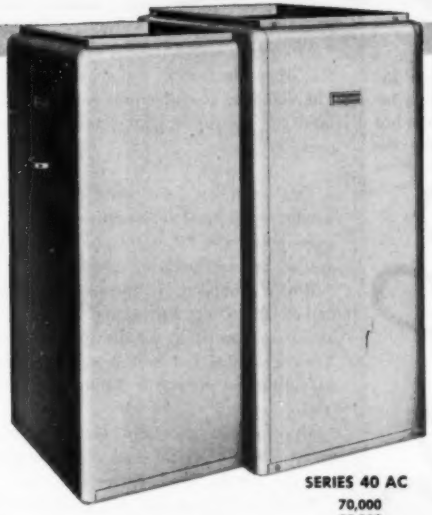
With Perfection since 1947, Mr. Conners has been a member of the furnace division for the past three years.

PAUL WATTS, vice president in charge of sales for Skilsaw, Inc., manufacturers of portable power tools, has announced address changes for Skilsaw's San Francisco and Cleveland branches. The new addresses are: Skilsaw, Inc., 295 South Van Ness Ave, San Francisco 3, Calif.; and Skilsaw, Inc., 3038 Payne Ave, Cleveland 14, Ohio.

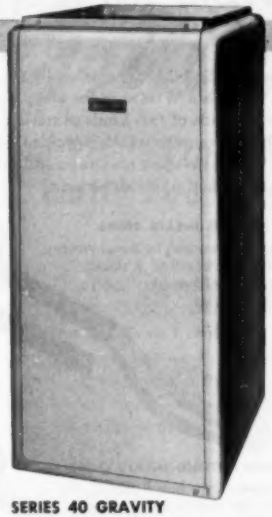
Both branches are now located in new and modern buildings having a floor space of 3,000 sq ft and are equipped with complete facilities for servicing and demonstrating tools. A complete line of Skill Tool accessories is carried by both of the branches. Each outlet has a parking lot adjoining its new location.

New NIAGARA GAS-FIRED STEEL UNITS

GRAVITY and/or AIR CONDITIONING



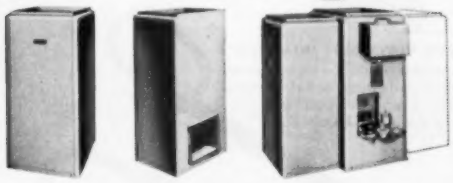
SERIES 40 AC
70,000
90,000
115,000
BTU INPUT



SERIES 40 GRAVITY
60,000
80,000
105,000
BTU INPUT

EXCEPTIONAL FLEXIBILITY! • COMPETITIVELY PRICED!

Gravity Furnace + Blower-Filter Package = Complete Winter Air Conditioning Unit



Cover over controls of either Gravity or Air Conditioning units is optional, at extra cost.

Blower-Filter unit may be installed on either right or left side.

With these new Series 40 Niagara steel gas-fired home-heating units, in addition to the popular Niagara cast-iron units and steel hi-boy units, Niagara dealers are ideally prepared to meet any competition. The units are factory assembled, delivered ready for speedy installation.

Write for catalog.

NIAGARA FURNACE DIVISION The Forest City Foundries Company • 2500 West 27th St. • Cleveland 13, Ohio

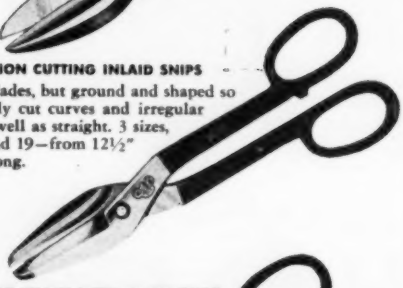
NIAGARA **makes all 3: Gas • Oil • Coal Furnaces • Cast Iron or Steel**

The best name in snips is WISS

WISS metal-cutting snips are carried by leading supply distributors. There is a WISS snip for every purpose. WISS Inlaid Snips are made of two kinds of steel, a super-tough hot dropped forged frame to which is welded a high carbon crucible steel blade providing toughness and sharpness superior to any other method of construction.

STRAIGHT CUTTING INLAID SNIPS
The basic snips for straight metal cutting. Gun Metal finish handles. 5 sizes, #6½, 7, 8, 9, 10—from 11½" to 15¾" long.

COMBINATION CUTTING INLAID SNIPS
Straight blades, but ground and shaped so they readily cut curves and irregular shapes as well as straight. 3 sizes, #17, 18 and 19—from 12½" to 14½" long.



#5 BULLDOG HEAVY DUTY INLAID SNIPS
For cutting tough alloys—monel metal, stainless steel, Allegheny metal. Invaluable for bench work for notching and cutting strap iron bands. 17" long, 2½" cut.

WISS snips are produced largely by the hand work of skilled workers. Each pair is rigidly tested and guaranteed perfect. Bolts are set precisely to reduce wear and to increase cutting power with minimum effort. Blades are adjusted carefully and will remain in adjustment for an unusually long time, even with hard use. Edges have a special bevel which contributes to the ease of cutting, yet assures lasting sharpness.

Quality for over a century

J. WISS & SONS CO., NEWARK 17, N. J.

PLASTEEL PRODUCTS CORPORATION of Washington, Pennsylvania has named R. J. Smith as general sales manager of the company.

To meet the increasing demands due to current needs, the firm is engaged in an extensive program of expansion to which Mr. Smith brings valuable knowledge and experience. Previously serving in a similar capacity handling steel building products, Mr. Smith is well known to the industry as well as familiar with its needs.

Mr. Smith will make his headquarters in Washington, Pa., where the factory and general offices are maintained. The company manufactures roofing and siding which is used for industrial plants and factories from coast to coast.

THE FIRST OF a proposed series of service outlets to handle repairs and replacements of gas controls has been announced by A-P Controls, Milwaukee, manufacturers of gas, oil and refrigeration controls.

Roy W. Johnson, A-P president, said the company had named the Ohio Pump and Service Company as an authorized outlet to handle gas controls. The firm is located at 7904 Lorraine Ave., Cleveland, and is one of 44 authorized outlets providing service for A-P oil controls.

Mr. Johnson indicated that service outlets for gas controls will be established wherever gas is prevalent, to provide "on-the-spot" service to dealers and servicemen.

At the same time, the A-P president said his company plans to conduct an educational campaign for servicemen employed by utilities. A recent training school of this type was held for service employees of the East Ohio Gas Company.

The Ohio Pump and Service Company is managed by W. W. Rattrich, who has completed the A-P Controls factory training course provided for all service station personnel. The Cleveland outlet will handle a complete line of A-P controls.

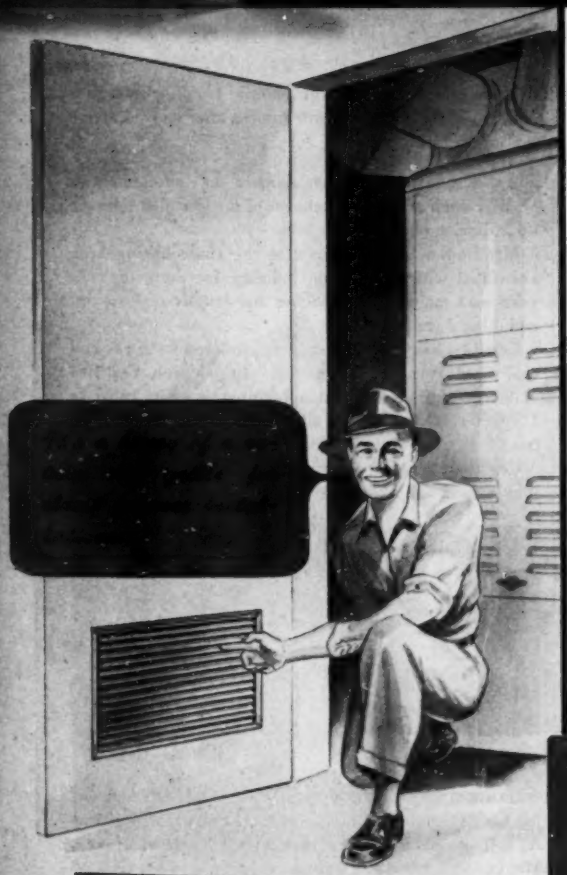
AMERICAN RADIATOR & Standard Sanitary Corp. revealed expansion programs recently costing nearly $4 million at two plant locations.

Involved are the corporation's Elyria, Ohio, plant and the stamping plant in Buffalo, N. Y. The developments are aimed at increased production, improved warehousing and better working conditions according to president, Theodore E. Mueller.

At the stamping plant, installation of facilities for metal processing, painting and plant-wide conveyor system for handling materials will cost approximately $2 million. Completion is scheduled for late 1952.

Costs at the Elyria plant will total nearly $2 million including the construction of a new warehouse. Built to expand storage space for the warm air heating equipment manufactured there, the one story structure, built of concrete block, will provide 170,000 sq ft of floor space.

Designed by Prack & Prack, Pittsburgh architects, the warehouse will provide the American-Standard plant with



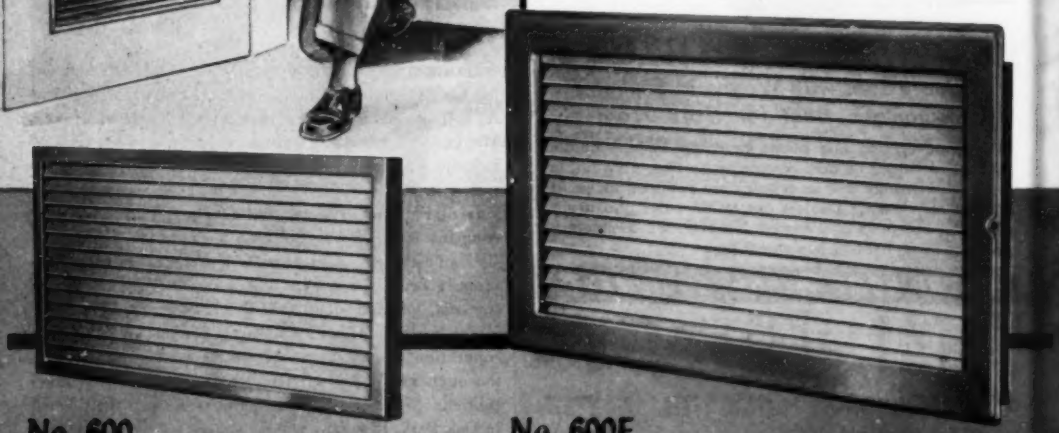
Air Control's New

VISION-PROOF

Grilles

The ideal Vision-Proof Grille for doors, walls and return air intakes.

Perfect for applications requiring ample ventilation and privacy. They cut down sound transmission. Used in doors, partitions, walls and return air intakes. Narrow ¾" core makes the Vision-Proof Grille ideal for installation in thin, interior doors. You can use these beautiful, new Vision-Proof Grilles in any installation and be assured that they will blend with any interior.



No. 600

Grille is made of inverted V-shaped louvers set into channels. Spacing permits ample ventilation yet is Vision-Proof. Grille has no frame and is easily installed in opening with quarter-round trim. Ideal for residential or commercial installations.

No. 600F

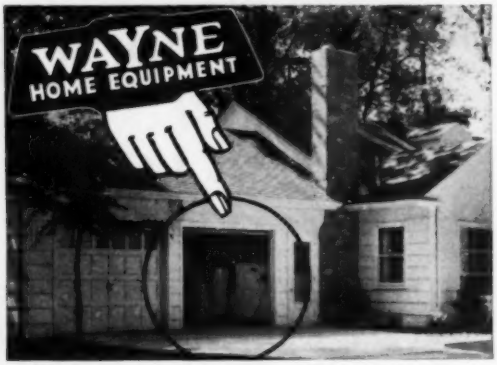
Same core as Style 600 but with 1⅛" frame. Grille is installed in opening with screws through holes in the frame. On door installations the other side can be finished off in quarter-round or an additional frame can be furnished.

Built in a range of sizes for all residential and commercial applications. VISION-PROOF Grilles are finished in Beige Prime Coat — can be painted as desired.

For complete information and prices see your Air Control Jobber or write direct to Air Control Products, Inc.

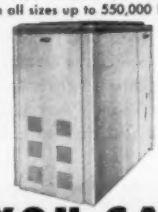
AIR CONTROL

THE BETTER JOBS ARE



THE *Complete* LINE

Wayne provides equipment for EVERY TYPE of warm air installation in all sizes up to 550,000 BTU.



***New, Improved* OIL BURNERS**

New Wayne burners are more efficient than ever in Wayne's 28-year history. All are factory guaranteed.

***Conversion* GAS BURNERS**

Designed for lifetime customer satisfaction. You'll get "more profit" featuring the Wayne line.

NOW YOU CAN GET

More Jobs with Wayne in Selling Automatic Heat for More Profit

Wayne advertising and public acceptance help you sell. Millions of magazine ads, newspaper service, store display material, literature and sales helps are designed for you to cash in on. Wayne Dealers get MORE sales and profits. You, too, can have and feature WAYNE, the complete oil and gas home heating equipment line.

WAYNE HOME *Heating* EQUIPMENT

Winter Conditioners • Furnaces • Gas-Oil Burners • Floor Furnaces

GET WAYNE NOW

Act NOW to strengthen your supply and sales position. Consider the continuous demand for Wayne home equipment. Get set now — with Wayne — for more sales this year and in future years.

- ***Write For Wayne Franchise Details.***

WAYNE HOME EQUIPMENT CO., INC.
800 GLASGOW AVE. FORT WAYNE 4, INDIANA

the most modern methods of material handling and offer both truck and railroad loading docks after its completion in March, 1952.

ANNOUNCEMENT has been made of the appointment of M. W. Bowen as general manager of the Certified Furnace Co., Minneapolis, Minn.

Mr. Bowen is well known to the trade having been associated with the heating industry for more than 25 years as a manufacturer, jobber and retailer of furnaces, and oil and gas burners.

Certified has developed a complete line of oil, gas and coal fired furnaces for homes. In addition Certified Mammoth furnaces are manufactured in units rated to 1,500,000 Btu for heating all types of commercial, industrial and public buildings.

Certified furnaces are distributed through regular jobbing and retail outlets throughout the United States.

M. W. Bowen

A. F. Ludolph

COMBUSTIONEER DIVISION, the Steel Products Engineering Co., Springfield, Ohio, announces the appointment of A. F. Ludolph as district manager for northern Illinois. Mr. Ludolph has had 24 years' experience in the heating industry, starting with the original Combustioneer organization in 1927. In 1932 he organized the heating division of Fairbanks, Morse and Co., remaining with that company until the division was discontinued in 1950.

Combustioneer, a pioneer in the stoker industry, has recently developed a complete line of heating equipment for coal, gas and oil, which Mr. Ludolph will represent in the northern Illinois territory. He brings to his new connection a wide acquaintance in the territory and a thorough knowledge of the heating field and its possibilities. Mr. Ludolph and family will make their home in Oak Park, Illinois.

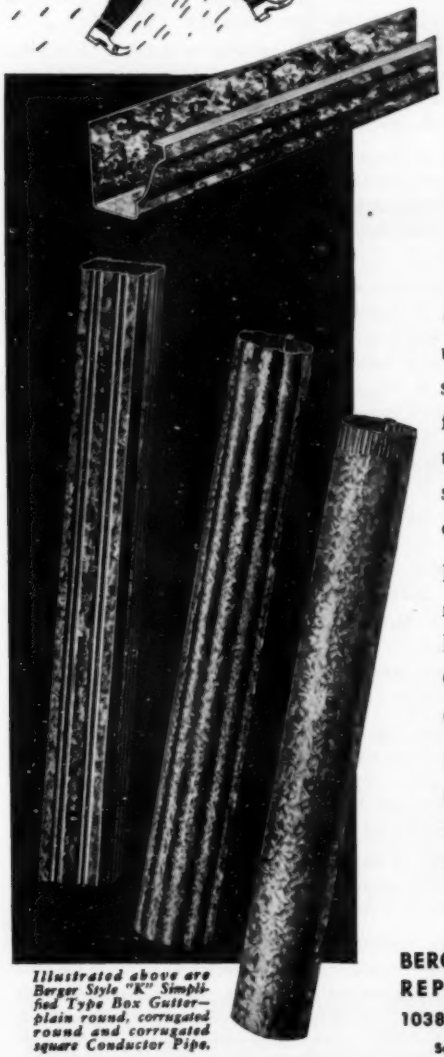
HARRY M. BIRNS, former sales engineer of the Diamond Machine Tool Co., 3429 East Olympic Blvd., Los Angeles, Calif., has rejoined the company and is again on the sales staff. Mr. Birns started with the company at the inception of the business and spent the years between 1942-46 covering the entire Pacific Coast for them.

Harry Birns is well known in the machine tool industry having started his experience in the automotive plants of Cadillac, Ford and Packard in Detroit. During World War I he was instructor on carburization and ignition at a Minnesota aviation school.

He is thoroughly acquainted with the company's line of precision metal working machinery. In addition, he

In rain or snow... or 20 below

BERGER
CONDUCTOR PIPE AND GUTTERS



Illustrated above are Berger Style "K" Simplified Type Box Gutter—plain round, corrugated round and corrugated square Conductor Pipe.

ASSURE LONG LIFE AND TROUBLE-FREE SERVICE

● Berger drainage products have proved unexcelled for long life and trouble-free service under all weathering conditions. Made from galvanized steel, they resist rust and the abuses of fabrication and wear. Rigid seams of Berger Conductor Pipe prevent distortion when installed.

Formed in one operation in long length on machines that never vary, Berger Conductor Pipe and the simplified practice Type "K" Gutter are always *uniform*—make installation easy and rapid.

See your local distributor about Berger Conductor Pipe, Accessories and Gutters—also SNAPTITE Eaves Trough, Roofing of all types and Metal Lath. Berger is playing no favorites in distributing its products.

BERGER MANUFACTURING DIVISION
REPUBLIC STEEL CORPORATION
1038 BELDEN AVENUE • CANTON 5, OHIO

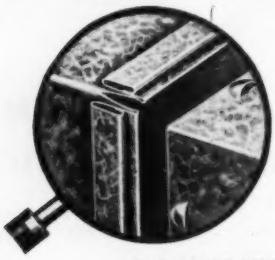
Sales Offices in Boston, Detroit, Indianapolis, Philadelphia and St. Louis

REPUBLIC STEEL

ADELTA
takes the Work out of
DUCTWORK!

ADELTA warm air systems have been redesigned from plenum to register... bringing you many *exclusive* fittings and *time-saving* features like those illustrated. And since ADELTA ducts and fittings cost no more than old-type units, your faster installation time means bigger profits.

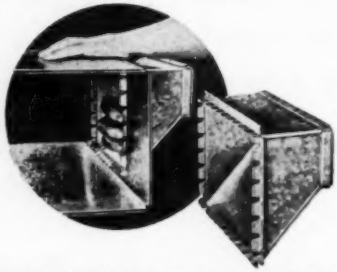
Investigate the ADELTA line today! Send for our illustrated catalog, showing the complete line of standardized ducts, pipes and fittings. No obligation.



ONE-PIECE SNAP-LOCK

CLEAT WITH THE TAPERED LEADING EDGE

...is an exclusive feature on all ADELTA Stack, Trunk and Fittings. You just push two sections together, and presto!—you have a rigid, leakproof joint... without any drilling, notching or crimping to slow up the job. Cleat can't get lost in shipment or on the job because it's formed from the same sheet as the fitting.



NEW PRE-NOTCHED COLLAR EDGES

. . . save time on every collar edge connection because they're easily closed by finger pressure. No need for the installer to notch the edges, straighten them with pliers, and hammer them closed. Notches are die-cut in a U-shape, and corners are rounded to prevent finger injury. Provided on all 4 sides of fittings with collars—at no extra cost.

INDOOR COMFORT

ADI STANDARDIZED SYSTEMS

ADELTA
MANUFACTURING COMPANY, INC.
2103 Ellsworth Street • Philadelphia 46, Penna.

is familiar with the manufacturing needs of Southern California and will cover the state from Bakersfield south to the border.

CHICAGO STEEL SERVICE CO., large independent distributor of stainless and carbon steel, has moved into its new general offices and warehouse on Kildare Avenue at 45th St., Chicago, according to an announcement by Walter D. Monroe, Jr., president.

The new $1,500,000 warehouse provides 120,000 sq ft of floor space in a one story steel frame structure. The facilities include the latest developments in materials handling as well as equipment to process orders for special shapes and sizes, it is stated.

Plans for the warehouse were furnished by A. Epstein & Sons, and Fallon, O'Donovan & Rassus were the contractors. The new building is located in Chicago's central manufacturing district.

E. J. Doucet, vice president and general manager of sales for the Detroit Lubricator Co., a division of American Radiator and Standard Sanitary Corp., has announced eight new appointments in the company's sales department.

Appointed were:

K. B. Thorndike, vice president in charge of eastern regional office, New York; formerly vice president in charge of western regional office, Chicago.

F. G. Coggin, assistant general manager of sales; formerly manager, refrigeration controls division.

F. Y. Carter, manager, refrigeration controls division; formerly chief refrigeration sales engineer.

W. H. Hohmeyer, manager, sales research and promotion; formerly manager, heating controls division.

H. L. Walker, manager, heating controls division; formerly assistant manager, heating controls division.

H. Ledyard, manager, industrial products division.

T. C. McKee, Jr., manager, west central regional office, Chicago.

F. J. Kreissl, manager, east central regional office, Pittsburgh.

WESTINGHOUSE ELECTRIC Supply Company, with offices in Long Island City and Newark, has been appointed exclusive distributor for room air conditioners in the Metropolitan New York and northern New Jersey areas by the United States Air Conditioning Corporation.

Sales of these products, which include window and console type air conditioners, will be directed by Harry LaGue in Wesco's Long Island City branch.

THE KALAMAZOO STOVE & FURNACE Company announces the appointment of Russell F. Ekrut to the position of general service manager. Mr. Ekrut was formerly associated with Whirlpool Corporation as Assistant to Director of Service. He is widely known for the work done during the past eight years in helping to develop the service department of that organization to the enviable position it enjoys today.

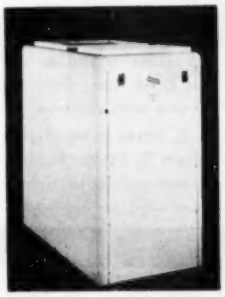
HESS

for a Complete Line

There's a big advantage in meeting all your requirements from one reliable manufactor. The HESS line meets practically every warm air heating need . . . whether gravity or forced air . . . for gas, oil or coal. HESS' 78 years of experience and leadership is your assurance of top quality and constant improvement.

HESS

for Customer Satisfaction



Hess furnaces have long been outstanding both in *high efficiency* and in *long life*. The basic HESS principle of *square heat exchanger* offers greatest possible heating surface. Customers will like the smart cabinet design and the gleaming *white* baked enamel finish — available on most models.

HESS

for more profit

Selling HESS means easier sales . . . greater volume . . . less service . . . more profits for you. Write today for details on the Hess profit-winning line for '51.

The Hess Company

132 N. CLINTON ST. CHICAGO 6, ILL.

SINCE 1873 OUR 78th YEAR

Super Cleaning is the Key To Profit and Service In Today's Emergency

SUPER RED STREAK MODEL SH—

The heavy duty cleaner that has everything.

YOU are the one owners must depend upon to keep their old plants delivering heat during the emergencies and shortages confronting all domestic heat users today.

With the new Super Red Streak Model SH you can be profitably cleaning all kinds of furnaces in your community and at the same time selling conversions, new parts, repairs, services of many kinds. When breakdowns occur, the man with the Red Streak gets the repair and replacement jobs before competitors are called in.

The Super Red Streak Model SH provides both wet and dry pick-up. Cleans all types of heating plants, chimneys, air ducts, boiler tubes and takes up debris from flooded basements. A special oil soot filter bag makes oil burner cleaning a fast, easy job. The Super Red Streak can be converted quickly to a blower.

Ask your wholesaler or write at once for complete data on the Super Red Streak SH and its specialized tool equipment. The FREE SUPER SALES PLAN BOOK, sent on request tells you how to build a furnace cleaning business that really pays off. Get set now for a long, busy, profitable winter.

NATIONAL SUPER SERVICE CO., INC.
1944 N. 13th St. • Toledo 2, Ohio

SUPER SUCTION

SINCE 1911

"THE DRAFT HORSE OF POWER SUCTION CLEANERS"

DIAMOND MANUFACTURING CO., Wyoming, Pa., producer of perforated-metal sheets and parts, announces the election of David C. Hall as president and general manager, succeeding the late William M. Powell. Formerly vice president and purchasing agent of Diamond, Mr. Hall holds degrees in engineering from both Princeton and Harvard and is well qualified to maintain the high standards established by this company during its 36 years of service to a wide variety of industries.

S. D. ANDREWS, who joined General Controls Co. of Glendale three years ago as an employee in the company's San Francisco branch, has been appointed branch manager of the Dallas, Texas office, according to J. F. Ray, vice-president in charge of sales.

S. D. Andrews

C. M. Dunn

He will replace Robert Farmer who will return to the Glendale plant as a factory engineer.

Mr. Andrews, who received his education in the Glendale school system, formerly was employed by North American Aviation and the Alemite Co. of Southern California. Prior to joining General Controls, he was a partner in a firm specializing in the installation of industrial lubricating equipment.

Mr. Andrews' new position will entail complete charge of all Dallas branch office territory activities, including sales, engineering and service on automatic controls.

CLIFFORD M. DUNN has been appointed manager of General Electric Co.'s Michigan apparatus district. The appointment was announced in Schenectady, N. Y. by Horace Zimmer, manager of field sales for the firm's apparatus marketing division.

As district manager, Mr. Dunn succeeds Arthur R. Hines, who has been appointed assistant manager of marketing for the company. Mr. Dunn's headquarters will be in Detroit. The district comprises most of the state of Michigan.

Born in Wichita, Kansas, Mr. Dunn is a graduate of Washington University, St. Louis, where he received a degree in electrical engineering. He has been a General Electric sales representative in the Midwest since 1932.

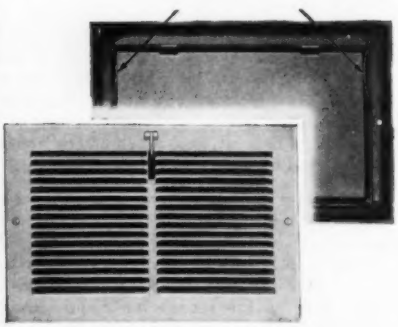
Mr. Dunn served as resident sales representative in South Bend, Ind., from 1932 until his appointment in 1946 as a sales engineer in G-E's Detroit office.

U. S. STEEL company has announced the appointment of Albert R. Pfeltz, Jr., formerly of Chicago, as assistant sales manager in its Cincinnati district sales office. He

TAKE OUR CUSTOMERS' *GOOD ADVICE*

REAR VIEW SHOWING
DOUBLE SPRING ACTION—
PROVIDES SMOOTH OPERATION
& AUTOMATIC TENSION TAKEUP

Start Using A&A REGISTERS And SAVE!



No. A-32

COMPLETE FRAME AND GASKET ON ALL WALL REGISTERS

SEND FOR CATALOG

THE A & A REGISTER COMPANY
8327 CLINTON RD. CLEVELAND 9, OHIO

GUTS! THAT'S WHAT COUNTS WHEN YOU TALK ABOUT A BLOWER-FILTER PACKAGE

• This is the Bearing Bracket Assembly all Blowers should have but only Rex "Air-Pak" has got it.

- A 4 to 5-year oil supply.
- Oil level always visible.
- Self-lubricating bearings.
- Only blower bearing that can be replaced on the job.
- Permits greater air flow.
- Bearings are self-aligning.

THIS IS THE "INSIDE" STORY ABOUT "REX"

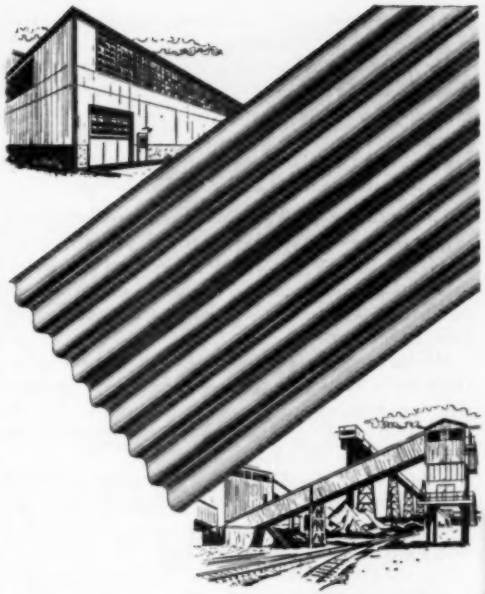
Maybe it's tied up with fancy ribbons to make it look pretty, but you had better look inside the "package" if you don't want to eat up your profits with service calls.

Now, take the Rex "Air-Pak" Blower-Filter Package. Let's talk about one of its exclusive features . . . *the Air-Flo Bearing Bracket Assembly.* It's the only self-contained unit made with replaceable bearing . . . requires 56 seconds to remove it and 48 seconds to replace it

It's the only assembly with sight-feed oil reservoir; holds 4 to 5-year oil supply. It's got the largest self-oiling bushing with greatest bearing surface.

Rex "Air-Pak" has got a lot more you'll like. Investigate — compare — then you'll ask your jobber for "Rex" on every job.

Air Controls Inc. — DIV. CLEVELAND HEATER CO. 2810 SUPERIOR AVENUE CLEVELAND 14, OHIO



FAST Construction LESS Maintenance

when you build with ALUMINUM

All the facts you need to design and erect buildings using Alcoa Industrial Building Sheet have been assembled in this new book. Loading tables, application details and accessory lists, show you how you can save erection time and maintenance costs.

Write for FREE BOOK

BECAUSE REARMAMENT NEEDS COME FIRST, the supply of Alcoa Industrial Building Sheet is limited, but Alcoa is not limiting its assistance to designers and erectors. For special information and a copy of booklet AD-247, call your local Alcoa Sales Office, or write ALUMINUM COMPANY OF AMERICA, 807K Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA

ALCOA

INDUSTRIAL BUILDING SHEET

has been assistant to the sales manager in the New York district for the last four years.

Mr. Pfeltz, a native of Baltimore, attended Peddie School and the University of Pennsylvania, where he graduated in 1934. He spent two years with Republic Steel corporation before joining U. S. Steel in sales training in 1936. He progressed through various sales positions until acquiring his new responsibilities.

THE ELECTION OF W. A. Matheson, nationally known sales executive and consultant, as vice president of the American Bildrok Co., manufacturers of lightweight aggregate building materials, was announced by Thomas H. Coulter, president, following a recent meeting of the board of directors.

Mr. Matheson was formerly president of the Williams Oil-O-Matic Heating Corp. and later became executive vice president when that company merged with the Eureka Vacuum Cleaner Co. He is now a member of the Eureka Williams Corp. board of directors.

In his long association with the oil heating equipment industry, Mr. Matheson was twice president of the Oil-Heat Institute of America. He has also authored a best selling sales book — *The Selling Man*.

For the last year Mr. Matheson has been director of dealer relations of American Bildrok.

AN INTERESTING and informative three day meeting of the Toridheet dealers in the Philadelphia area took place June 11, 12 and 13th, at the sales-rooms and offices of the John A. Connelly Co., 4308 North Broad Street, Philadelphia, Pa., Toridheet distributor for southeastern Pennsylvania. This meeting was under the co-direction of J. A. Lappin, eastern district representative for Toridheet and Duane W. Rouse, Toridheet's national service manager.

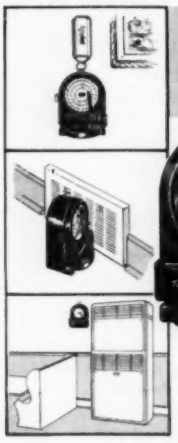
A group of 52 men, dealers and their technicians, attended the daily meetings. They were instructed in detail on the installation and servicing of the Toridheet rotary wall flame burner. They also heard discussions of the engineering and sales features of the Toridheet line of automatic heating equipment. Luncheon and refreshments were supplied daily by their host, John A. Connelly.

BRYANT HEATER DIVISION Affiliated Gas Equipment, Inc., has announced the appointment of the Dykes Company, Inc., as the Bryant distributor for northern Louisiana and part of Texas and Arkansas.

The Dykes Company was organized in 1947 with headquarters at 1012 Market Street, Shreveport, Louisiana. The company is headed by O. J. (Jeff) Dykes, Jr., who graduated from Georgia Tech in 1941 as a mechanical engineer. During the period from 1941 through 1945, Dykes served as an officer in the Navy and participated in numerous Pacific invasions.

The Dykes Company will distribute the complete line of Bryant heating, water heating, and air conditioning equipment, and maintain showroom and service facilities.

SERVICE Instruments for Measuring AIR TEMPERATURE and AIR VELOCITY



TEMPSCRIBE
Recording Thermometer

Available in 10 different ranges to cover — 30°F to +160°F temperatures, and with spring-operated chart drives for any of the following chart rotations: 8 hours, 24 hours or 7 days.

This entirely self-contained, compact and reliable temperature recorder automatically writes a continuous record of temperature changes on a replaceable chart. Record shows at a glance maximum and minimum temperatures and the duration of temperatures above or below any given point; also shows the exact time of every temperature change and how rapidly it takes place. Recording pen and bi-metallic element are built in hinged, removable door which is also front of instrument. Thus, by merely changing doors it is easy to interchange temperature ranges or to convert to the Operation-Time Recorder described below. Instrument is 8" tall, 5½" wide and 4½" deep. Charts are 4½ inches in diameter.

● **OPERATION-TIME RECORDER**

This instrument has a door unit which is identical to the door of the Recording Thermometer shown above. It makes record of number, frequency and duration of electrical operations such as starting and stopping of motors, heaters, etc. Pen is moved by the energizing of an electro-magnet when contact is closed. Available for either parallel or series connection.

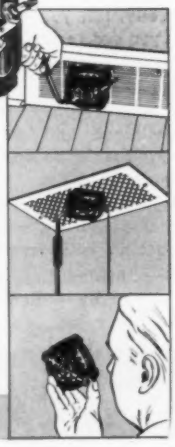
Ask your Jobber or Write for Bulletin 720

FLORITE
Air Velocity Meter

Available in two styles:
One with a scale of 0-1000 ft./min., and the other with a double scale of 0-3000 ft./min. and 0-35 miles per hour.

In principle, this unique instrument operates as an anemometer but provides instantaneous, direct readings of air velocity without timing, calculations or reference to charts. Readings are obtained by holding the instrument in the air stream so that air blows against its circular face, causing rotation of a multi-blade rotor mounted in instrument housing. The circular scale surrounding the rotor instantly turns to correct air velocity reading under an index pointer on scale window. This direct-reading anemometer is particularly useful for measuring air current velocities of air conditioning systems, grille velocities and air deliveries from registers and grilles; for balancing forced air heating systems, and for checking air distribution of all kinds of ventilating systems. Furnished with detachable handle (as illustrated), and leather case.

Ask your Jobber or Write for Leaflet 760



BACHARACH Industrial Instrument Co. 7000 BENNETT STREET · PITTSBURGH 8, PA.

Belt Sanders
Bench Grinders
Drills
Drill Stands
Fender Hammers
Grinders
Electric Hammers
Impact Wrenches
Nibbler
Nut Setters
Polishers
Sanders
Saws
Screw Drivers
Tappers
Valve Refacers
Valve Reseaters
Air Tool Kits

Thor

Silver Line

SAWS

SIX SIZES—BLADE CAPACITIES TO 12"

SAFER—EASIER TO HANDLE
FAR MORE POWERFUL!

1. SAFETY-LOCK SWITCH—positive protection against accidental starting.
2. EXTRA WIDE REENFORCED STEEL SAFETY BASE for better balance—easier to handle, safer to use.
3. LONG-SHAFT TRANSVERSE MOTOR MOUNTING transmits as much as 25% extra power, supports blade on oversize ball bearings from one side of the tool clear to the other.
4. UNIQUE SHOCK-ABSORBER GEARING harnesses the added power of these great new saws, gives extra life to motor, gears, spindle and blade.
5. PROTECTED DEPTH AND BEVEL SCALES. In plain sight when you use them—out of the way when you don't. Always accurate.

INDEPENDENT PNEUMATIC TOOL CO.
AURORA, ILLINOIS

Write Today For Free Electric Tool Catalog E-2

BUY IT from your DISTRIBUTOR

Thor TOOLS

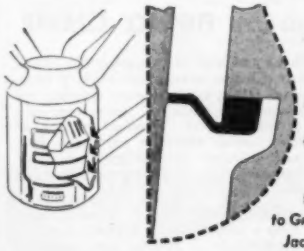
ASK FOR THE Silver Line

The same unfailing dependability..
The same ease of application...
The same economy...

but...
A Brand New Label...
for...

Grant Wilson ASBESTOS FURNACE CEMENT

Nothing is changed but the "appearance" on this famous "old timer"... a better looking container plus a cleaner looking cemented joint. It's still *THE* furnace cement that's thoroughly fireproof, smokeless, odorless and acid proof. Only top-quality high temperature refractories and binder materials are used in compounding Grant Wilson Furnace Cement—the *dependable* cement used by the most exacting Furnace Manufacturers and Installers in the Industry.

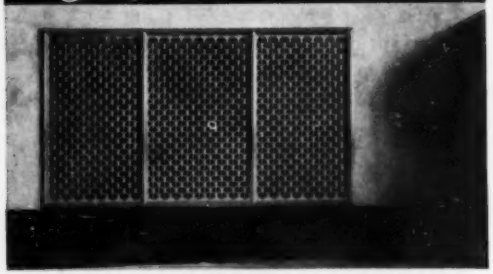


To make this "DANGER ZONE" a "Safety Zone" get Grant Wilson Furnace Cement from your Jobber.

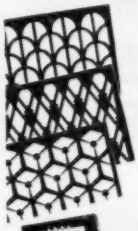
See for yourself... write for free Sample # 5310-A to Grant Wilson, Inc., 141 West Jackson Blvd., Chicago 4, Ill.

Grant Wilson inc.
ASBESTOS and INSULATING MATERIALS

Graceful **CONCEALMENT**



H & K ORNAMENTAL GRILLES



You will find that H & K Grilles combine the ultimate in grille art with rugged protection and adequate air circulation for all purposes.

Perforated in finely finished, unbreakable metal plates, these Grilles of harmonious beauty and richness will render years of enduring service.

A wide selection of distinguished modern and classical patterns is available in brass, bronze, steel, stainless steel, aluminum, monel, nickel silver and other metals.

There is practically no limitation to the size, shape or form of Grilles we can furnish. They may be rectangular, square, round or odd in shape and flat, curved or angular in form.

Frames, louvers, invisible hand hole doors and registers can be furnished to meet exacting specifications.

Request Catalog #33

The Harrington & King Perforating Co

5649 Fillmore St., Chgo. 44 — 114 Liberty St., N. Y. 6

CLEAN EVERY TYPE of FURNACE

with a

GRAND RAPIDS *de luxe* FURNACE CLEANER

Large air volume and high velocity give the Grand Rapids Furnace Cleaner maximum recovery capacity. This means faster, more efficient cleaning for every type of furnace or boiler . . . plus more jobs and larger profits for you. Standard groups of attachments available with each Furnace Cleaner are designed to reach into and clean every part of the heating plant.

Service your furnace cleaning jobs with a Grand Rapids DeLuxe Furnace Cleaner. It is sturdy, long wearing and constructed to do a thorough cleaning job under the roughest conditions. Write today for information.

DOYLE VACUUM CLEANER CO.

227 Stevens St., S.W. Grand Rapids 7, Michigan

APPOINTMENT OF two new district managers for the Armstrong Furnace Co. has been announced by L. G. Hickok, Armstrong executive vice president.

New district manager for the New England states is Ross Huntington, native of New Hampshire, a graduate of Becker College, Worcester, Mass., who now makes his home in Schenectady, New York. Mr. Huntington has had five years of experience in the heating business, during which time he has worked with Armstrong heating equipment at the retail level. Starting as a canvasser for an Armstrong dealer in Rockford, Ill., he became sales engineer and later sales manager for the same organization. In his new assignment, he will assist Armstrong distributors in the New England area in merchandising.

Ross Huntington

C. L. Brooks

Newly assigned as district manager in eastern Illinois, Indiana, Kentucky and western Tennessee, is Charles L. Brooks, a native of Ohio, graduate of the Ohio State University, who currently makes his home in Springfield, Ohio and will soon relocate in or near Indianapolis. After two years in selling for a national drug company and two years in the Army, Mr. Brooks joined the Steel Products Engineering Co., Springfield, as sales promotion manager, in which capacity he has gained a broad knowledge of the merchandising of heating equipment during the last four years. As district manager for Armstrong, he will provide merchandising assistance to Armstrong distributors in his territory.

WITH THE HOUSE WARMING on July 27 for employees and their families at the Prat-Daniel Corp. plant in South Norwalk, Conn., the corporation wrote finis to a difficult yet interesting plant relocation story.

For the past 17 years, Prat-Daniel manufactured stacks, dust collectors, induced draft fans, and similar power plant equipment, as well as space heaters in East Port Chester, Conn. The executive offices were housed on the second floor of a long rambling mill-type structure, the first floor of which was the Prat-Daniel factory.

The last decade has seen a great surge of activity in the smoke prevention dust collecting fields. The result was that Prat-Daniel equipment was being specified for more and more power plants and industrial buildings. Despite two-shift operation, production could not keep pace with orders.

At East Port Chester, plant expansion was not possible, since the Prat-Daniel building was bounded by a road, a lumber yard, a bulk oil delivery plant, and the Byram

LO-BLAST ECONOMITE

. . . proves amazingly successful in cutting heating costs and improving comfort

A heating engineer writes:

"We got the gas bill and could hardly believe what we saw. Where we used to pay between $30 and $40 per month for oil and another $7 to $10 for bottled gas, our total for last December came to $16.17 (compared to over $40 for December, 1949).

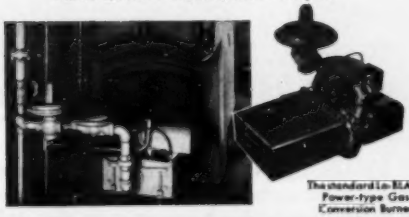
"Our electric bill was also smaller and to top it off, our house was more comfortable, even though December, 1950 was a colder month than December, 1949. The pilot flame of the gas burner seems to supply just the right amount of heat to the furnace walls to maintain a temperature just below the cut-in point of the fan control. A few seconds after the burner starts, the blower starts and thereby stratification is practically eliminated.

"In my 20 years' experience as heating engineer, *I have never been more pleased with the performance of any apparatus than the Economite.*" *(Name and address on request)*

Dealers!

The above letter shows why Lo-BLAST Power Gas Conversion Burners sell! For over 19 years Lo-BLAST Burners have cut heating costs in buildings of every size and character. Write—today—for full information.

Lo-BLAST Burners are available in capacities from 70,000 to 20,000,000 BTU input.



The standard Lo-BLAST Power-type Gas Conversion Burner

MID-CONTINENT METAL PRODUCTS CO.
1960 N. Clybourn Ave., Chicago 14, Ill.

FOR trouble-free Gas Appliances

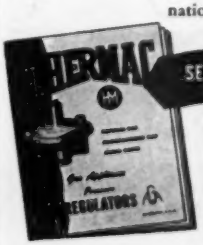
USE THERMAC

HM Appliance Regulators

1. ***Provides constant pressures, constant BTU input and constant flame height.***
2. ***Eliminates pilot light failure due to fluctuating pressures. Assures proper operation of automatic controls.***
3. ***High capacity, close control. Low maintenance.***
4. ***Aluminum alloy, light weight. Sizes: ⅛" to 2½" IPS.***

APPLIANCE BUILDERS CHOOSE THERMAC

Millions of THERMAC Gas Appliance Regulators are in service today on gas furnaces, space heaters, conversion burners, refrigerators, water heaters, air conditioners, boilers, dryers, etc. More and more manufacturers are going to THERMAC simply because THERMAC Regulators are *DEPENDABLE* 24 hours a day under all operating conditions. The reputation of a fine appliance depends in no small degree upon the behavior and control of its gas regulator. Play safe. Use THERMAC—a product with wide national acceptance.



SEND FOR complete literature and prices

THERMAC COMPANY
800 East 108th Street • Los Angeles 2, Calif.

"20 years experience in building gas controls."

...here are the reasons why

Grant Wilson
DUX-SULATION
ASBESTOS PAPER FACED

is BEST FOR DUCT INSULATION

1 High thermal and acoustical insulating properties...K factor of .27 BTU and sound absorption approximately 61%. Integral, woven asbestos membrane.

2 Easy to handle, easy to install correctly, can't be crushed or cracked, springs back to original thickness if compressed. Supplied with special glue and tape, no "fasteners" needed.

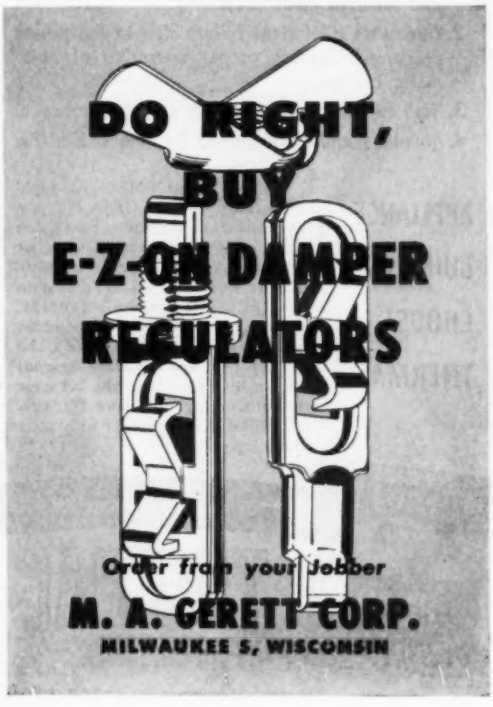
3 Constant insulating values. Can't "powder", shift or sift; no thin spots, even at corners. No deterioration of any kind, no change of any kind.

4 Perfect adhesion, flexible, conforms to uneven surfaces. Can be installed in the shop and still withstand all necessary handling. Specifically engineered for duct application ONLY!

Inspect Dux-Sulation yourself!
Write Grant Wilson, Inc. 141 West Jackson Blvd., Dept. A Chicago 4, Illinois.

Grant Wilson inc.

IN NEW YORK CITY: Air Conditioning Utilities Co., 8 West 40th Street, New York 18, N. Y., LOngacre 3-4280.
IN CANADA: Atlas Asbestos Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver.



River. The pressure of new business forced the company into leasing several small plants throughout the city where sub-manufacturing was performed. This arrangement was quite unsatisfactory because of the necessary trucking between the various plants.

The only logical solution to maintaining production in line with customer demands seemed to be an entirely new plant location, and that was the course the company took.

In December, 1950, an existing plant on a five-acre tract, complete with good rail facilities was purchased. Rehabilitation and erection of shops and offices started at once and in late May of 1951, the first production crew started work at South Norwalk.

Three trucking firms ran what amounted to a shuttle service along the 21 miles of the Boston Post Road that separates the new plant from the old. Since Prat-Daniel is a heavy industry type manufacturer, just the movement of brakes, presses and shears alone presented terrific rigging and loading problems. Three specially licensed highway vehicles that carried loads up to 50 tons were used in the move. Three separate trucking firms made a total of 133 trips to complete the transfer.

RESULTS OF the recent Williams Oil-O-Matic Super-June Unit campaign, aimed at stimulating off-season sales of winter air conditioners and boiler-burner units, were described as highly gratifying by E. H. Davison, general sales manager of the Williams Division, Eureka Williams Corp.

Left, S. J. Dowling, Oil-O-Matic sales representative with Mr. and Mrs. Taverna, contest winners.

The campaign, which ran from May 28 through July 7, was based on company awarded prizes to dealers and their salesmen in direct proportion to their individual number of sales. Relative values of the prizes were determined by the number of sales points to their credit.

Tabulation of more than 2,000,000 points to hundreds of dealers and salesmen has been completed, Davison said, and the three high point scorers as announced are:

USERS SAY: CHAMPION'S OK!

Yes, the men who have been using these precision-made CHAMPION fittings will tell you they've proven time-savers and money-makers. They'll also tell you Champion's fair and square on delivery, too . . . always ready to give special attention to your emergency requirements.

Best of all, stocks of CHAMPION fittings right now are in good supply. Order now for prompt delivery.

Champion Furnace Pipe Co.

211 Eaton St., Peoria, Illinois

"550 More Pieces an Hour with a BETT-MARR Saw"

Says a Minneapolis Sheet Metal Shop Superintendent

"We now cut all ductwork pieces 6 to 12 times faster . . . for instance, it used to take an hour to cut fifty 16C ell wrappers by hand. With the Bett-Marr saw we do it in five minutes including set-up time . . . pieces are all uniform, too, which saves installation time."

Cutting 50 stacked blanks for reverse ells on a Bett-Marr saw.

● **BETT-MARR CUTS 50 to 70 STACKED GALVANIZED SHEETS** — at speeds up to 15 inches per minute. It's an all purpose 14-inch, ball-bearing band saw with blade speeds readily adapcable to cutting metals, plastics, wood, iron and steel castings and forgings.

● **SMOOTH, POWERFUL CHAIN DRIVE** — Blade Speeds from 125 FPM to 2200 FPM are quickly adjustable for cutting any material without blade chatter.

● **POSITIVE BLADE CONTROL** — Case hardened guides with carbide back-up bearing (adjustable up to ½" blade width) assure cutting accuracy. Flanged wheels control blade for smooth radius cuts and perfect straight line cuts.

● **PRECISION-BUILT** — Yet it costs little more than a home-workshop power saw. Its performance equals band saws costing many times more. Lifetime sealed precision ball bearings assure long, trouble-free performance. Blades and wheels are fully enclosed for safety.

MODEL 14-S*
Depth of Cut .. 8¾"
Blade to Frame 13½"
Table Size 20" x 22"
Overall Depth .. 34"
Overall Height . 44"
Blade Length . 93½"
Shipping Weight .... 210 lbs.

GET THE AMAZING FACTS
Learn how you can cut production costs with a Bett-Marr sheet metal saw. It pays for itself quickly in both large and small shops. (Equipment dealers — write for information on available territories.)

**Includes set of 4 sheet metal clamps and riser bar insert to match for sheet metal work*

MAIL THIS TODAY

BETT-MARR MFG. CO. HOPKINS, MINNESOTA

☐ Please send me more information on the Bett-Marr sheet metal saw.
☐ Where can I buy a Bett-Marr?

Name _____
Address _____
City _____ Zone ____ State _____

How to promote
greater PER-MAN
productivity!
Well-ventilated working environments contribute to faster, better defense production.
Western Rotary Turbine Ventilators provide constant, round-the-clock exhaust without power. A 2-mph breeze keeps your Western Rotary System in operation. Lifetime guaranteed bearings are both mounted on the same axis... always stay in alignment. Throat sizes 6" through 48", with the clean, low silhouette progressive industry demands.
Complete, up-to-the-minute information, sizes, capacities, and prices on all Western equipment upon request. In 1951 SWEETS and A.E.C.
In Stock At Your Favorite Wholesalers.
"ALWAYS ON THE JOB — NEVER ON THE PAYROLL"
WESTERN ENGINEERING & MFG. CO.
1726-28 E. WASHINGTON BLVD., LOS ANGELES 21, CALIF.

STREAMLINED HEATING EFFICIENCY
WITH THE XXth CENTURY ZEPH-AIR
completely automatic
OIL FURNACE
Streamlined heating efficiency is important to both you and your customers. In days to come fuel could be a scarce item and the furnace that extracts the most heat from the least fuel will be the one most talked about. That's where we come in . . . . we have a varied line of completely automatic oil furnaces to offer you. A size is available for any job and, of course, all Zeph-Air furnaces incorporate the cast iron primary heating surface to assure minimum upkeep for the life of the installation. The oil business is there waiting for you, and the Zeph-Air will help you clinch the sale. Write us . . . we'll tell you in more detail.
LOW-BOY OIL FURNACE. Front cover removed showing oil burner.
Remember, too, that each and every Zeph-Air is backed by this twenty-year warranty.
XXth CENTURY
Heating & Ventilating
COMPANY
AKRON OHIO

Americo J. Taverna, Taverna Coal Co., Prince's Bay, Staten Island, N. Y.: 72,300.

J. G. Brinkerhoff, Fuel Oil Service Co., Waterloo, Iowa: 42,800 points.

Gordon Peterson, Zenith Sales Co., Eau Claire, Wis.: 37,700 points.

Mr. Taverna's points alone, Mr. Davison pointed out, when tabulated into retail prize value exceed $550 and the top 60 salesmen averaging 17,000 points apiece, or more than 1,000,000 points as a group, will have their choice of almost $10,000 worth of merchandise out of a catalog listing 1,800 items.

"The success of the campaign was highly gratifying because its purpose was to stimulate off-season sales," Mr. Davison said, "and it did just that. The whole picture of summer sales activities was brightened at Oil-O-Matic."

Mr. Davison said the campaign was in keeping with Oil-O-Matic's policy of using strong promotional activity to liven up off-season months in the sale of oil heating equipment.

A NEW SERIES of educational shows, designed as a service to heating and refrigeration engineers and servicemen, began in Tulsa on September 24 and will travel throughout the western states, according to an announcement by R. H. Luscombe, general sales manager of Penn Electric Switch Co., Goshen, Indiana.

This show was created to give a dramatic visual demonstration in the use, construction, installation and servicing of automatic controls. Included in the elaborate equipment are giant controls which actually operate, colored slides, charts, and operating systems demonstrators.

Pioneer in Meetings

Penn has had considerable experience in creating and staging educational meetings of this nature. Over 17 years ago, the company pioneered demonstration shows with the objective of improving service to the consumer by giving instructional aid to the servicemen.

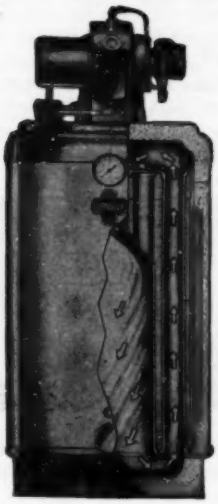
Although the current show is patterned after previous ones to some extent, it includes the latest current information and service helps, and it is expected to be even more beneficial to the trade.

Meetings are being arranged and sponsored in each city by local jobbers of Penn controls. According to Mr. Luscombe, each meeting will give the most thorough demonstration of controls possible in a single evening. After the regular session, individual installation problems will be discussed.

At present the Penn traveling heating show is scheduled to appear in the following cities: Houston on October 17; Shreveport on October 23; Little Rock on October 25.

The traveling refrigeration show is scheduled to appear in the following cities: Corpus Christi on October 15; Houston on October 18; Beaumont on October 19; Shreveport on October 24.

A "midget" that does a whale of a **two-way** *heating job!*



The ECONOLUX is easy to sell, easy to install, easy to service. It comes to you completely assembled—all ready to hook up to water, power and flue lines.

JOHNSON'S ECONOLUX 150-VW

Supplies abundant Hot Water Heat and ample faucet Hot Water for a 10-room home!

This amazing "midget" is making lots of new friends among both users and sellers. In spite of its compactness (it's only 24"x60" in size) it generates 150,000 B.T.U. output total . . . all the heat a good sized home in a cold country can use—and from a separate, outer-jacket compartment, it supplies automatic, day-and-night hot water as well.

Homeowners are delighted with its capacity . . . and amazed at its low fuel-consumption and efficiency. If you need an automatic heating-and-hot-water unit for domestic use . . . you ought to check up on the performance and the cost of this new Econolux.

ALSO AVAILABLE FOR STEAM RADIATOR SYSTEMS

ECONOLUX Model 150-VS

For use with steam heating systems, the ECONOLUX 150-VS is built without the outer water-heating jacket. Otherwise it is the same as the ECONOLUX 150-VW in size, capacity and operation.

Johnson Oil Burners

Builders of fine Oil Burner Equipment since 1903

S. T. JOHNSON CO.
940 Arlington Ave., Oakland 8, Calif.
401 No. Broad St., Philadelphia 8, Pa.

Over 60,000,000 ft. in service!

For more than 20 years, Johns-Manville Transite* Flue Pipe has proved its dependability and economy in thousands of installations throughout the country. To date, there have been more than 60,000,000 feet of this asbestos-cement pipe used for flue pipe installations!

For complete details, write for Folder TR-84A. Address Johns-Manville, Box 290, New York 16, N. Y.

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE FLUE PIPE

FOR VENTING DOMESTIC GAS-BURNING APPLIANCES

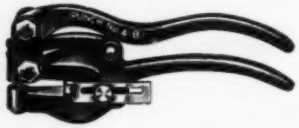
Performance Plus !
ATH-A-NOR
Coal - Gas - Oil
FURNACES
and PARTS

JOHN L. SULLIVAN became the world's heavyweight champion in 1889 by knocking out Jake Kilrain after 75 rounds of bare knuckle fighting.

THE PERFORMANCE PLUS of ATH-A-NOR has been proven thousands of times every year for a half century. Be sure of Higher profits—Be sure of complete customer satisfaction — you can with ATH-A-NOR—it gives more— Write or wire for details.

MAY-FIEBEGER COMPANY
MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS
Newark Ohio

A REAL Time Saver



The No. 4B PUNCH
by Whitney

This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of ¼" through 16 ga., weight 3 pounds, 8½" in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key. This tool also equipped with seven punches and dies in metal box.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD ILL.

VIKING AIR CONDITIONING Corp. has named three well-known heating men to judge its current contest to name its new 7 in. direct-drive blower package.

The panel, who will select the most appropriate name for the new compact Viking conditioner for small homes, will consist of George Boeddener, managing director of the National Warm Air Heating and Air Conditioning Association; I. E. Seith, sales manager of the Niagara Furnace Division of the Forest City Foundries Co.; and E. L. Wyman, executive secretary of the National Heating Wholesalers' Association.

G. Boeddener I. E. Seith E. L. Wyman

The contest is part of Viking's introduction program for its new small blower. Anyone in the heating field is eligible to submit a name which he thinks best describes the features of this new addition to the Viking line of blower packages.

The winner of the Viking contest will be awarded a Polaroid Land camera, the revolutionary nem camera that makes a finished, photographic print one minute after the shutter is snapped.

The contest closes midnight, October 31 and the winner will be announced as soon as the judging is completed. Entry may be made on a postcard addressed to Viking Air Conditioning Corporation, Cleveland 2, Ohio.

WM. J. WOOLLEY, chairman of board of Maid-O'-Mist, Inc., Chicago, and all his business life, a well-known figure in the heating industry, celebrated his 50th wedding anniversary on August 11. Mr. and Mrs. Woolley marked the occasion by greeting and entertaining a large group of friends and relatives who gathered from all parts of the country.

AS A RESULT OF the enthusiastic response given last year's affair, the Interstate Machinery Co., Inc., Chicago, announces plans for their second annual Machinery Fair and Open House, Wednesday, November 14 through Saturday, November 17.

Just as in last year's highly successful affair, everyone concerned with metal working machinery is welcome. The show is open from 9 a.m. to 9 p.m. at the Interstate warehouse and plant, 1431 W. Pershing Road, Chicago, Illinois. Refreshments will be served.

Over 2,000 new, used, and rebuilt metal-working machines — all ready for immediate delivery — will be exhibited in the Interstate warehouse, which is one of the world's largest. Many machines will be placed under power for inspection. Factory representatives of machinery manufacturers will demonstrate their companies' latest equipment.

BUY the DIFFERENCE
. . . at No Extra Cost

Only Airsan offers you ALL these Filtering features —

- *Galvanized steel frames*
- *Bronze welded corners*
- *Drain slots for quick, easy cleaning*
- *Expanded metal face plates act as lint arrectors*

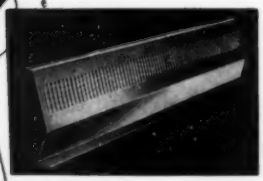
Airsan Air Filters are viscous type, permanent and cleanable. Write for free bulletins. "AIRSAN" is Reg. U.S. Pat. Off.

Air Filter Corporation
108 A NORTH WATER ST. • MILWAUKEE, WIS.
Canadian Representative
DOUGLAS ENGINEERING CO., LTD., MONTREAL
A Few Distributorships Available. Write for Details.

Darling it's so exciting . . .
I just can't wait
to see those sensational, new

STANDFORATED
Perimeter Baseboard Registers
WITH SLIDING DAMPER CONTROL

Write Now for Your Free Copy of Standard's Amazing New Pocket Catalog



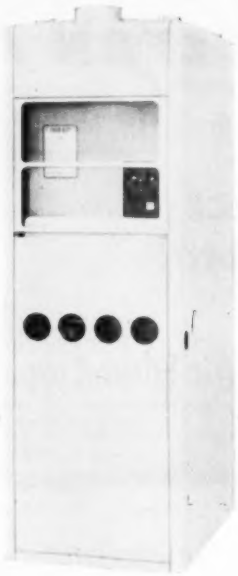
- Used in homes, schools, churches and commercial installations.
- Comes in four foot sections.
- Simplifies balancing of heating systems.
- Fabricated of 20 gauge steel.
- Finished with Prime Coat only—special finishes on request.

Standard Stamping & Perforating Co.
3137 WEST 49th PLACE, CHICAGO 32, ILLINOIS

Attach this to your business letterhead and mail for new catalog.

--- meeting today's demand for
Compactness and Economy ---

"THIN BOY, SENIOR"



- **90,000 BTU's**
- **FORCED WARM AIR FURNACE**
- **GAS FIRED**
- **ZERO CLEARANCE approved by the A.G.A.**
- **OCCUPIES floor space 20" wide by 28" deep. Under 5' in height.**

--- meeting the demand for better heating—more comfort ---

Write for the name of our nearest Distributor. Complete line of gas fired furnaces: Forced Air, Gravity and Floor.

INTERNATIONAL SALES CO.
2045 EVANS AVENUE
SAN FRANCISCO 24, CALIF.

Furnace Manufacturers Since 1908

"ATLAS" **"WESTERN"**

Kruckman —

(*From page* 30)

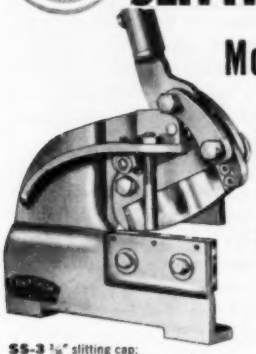
NPA finally concluded that the proper definition of small business is to describe it as an activity which does not produce a substantial portion of the total of the industry output. The Federal Trade Commission, after an exhaustive study, reported that smaller units are far more efficient than large businesses. NPA asserts employees of independent companies are not as efficient as the employees of units integrated in larger companies. It states 209,921 inpendent companies, with 47 per cent of all the workers in the industry, produced only 43 per cent of the industry output; while 30,000 workers, constituting 53 per cent of the employees in 7,000 large companies produced 57 per cent of the output. NPA records that establishments with fewer than 100 employees had 25 per cent of the workers and produced only 23.7 per cent of the goods. It asserts plants with less than 50 employees are the least efficient.

Senate banking and currency committee, split into three subcommittees, has held hearings on the substitute for the Capehart amendment and the Herlong amendment, drafted by Defense Mobilizer Wilson at the request of Chairman Maybank. Wilson and Maybank agreed the substitute, might be a workable amendment, reflecting "the intent of Congress" at the time the Capehart and Herlong amendments were enacted into law. The bill, S-2092, emphasizes the "level of prices." The act as now constituted is concerned with specific price ceilings. S-2092 gives OPS discretion in considering changes in all costs, except those of materials and direct labor, for ceiling adjustment purposes. The present act authorizes all cost increases mandatorily, "except such as the President may determine to be unreasonable and excessive." S-2092 requires "ceiling price regulation" to reflect "highest level of prices prevailing during a representative base period" between January 1-June 24, 1950, "adjusted for increases or decreases in costs between such period and July 26, 1951." Present act directs "ceiling price on any material" shall be "based upon the highest price" between January 1-June 24, 1950 adjusted to reflect cost increases or decreases occurring "subsequent to the date on which such highest price was received and prior to July 26, 1951." S-2092 requires the manufacturer, or processor, to show "financial hardship" under a ceiling price regulation to obtain special relief. The present act requires an applicant for price relief, under a ceiling, to make "a proper showing of his prices and costs."

Hearings are expected to consume two weeks, bringing the proceedings up to the end of September. The Congress wishes to adjourn by the middle of October. But it is very uncertain whether it will be able to clean the slate by that time. This revision of the law enacted less than two months ago is expected to be one of the major drags. The Senate is reported to be moderately agreeable to the revision. The situation is peculiar. When Truman's message reached Congress, as is well known, three

NEW **Beverly**

SLITTING SHEAR



More Power...
Easier Cutting
Exclusive Design
Cleaner Cuts
Ruggedly Built
last a lifetime
Capacities to 3/16"

SS-3 1/16" slitting cap; 5/16" trimming; 1/4" x 2" bar capacity

Get faster, easier slitting and trimming with a new design Beverly "SS" Series Slitting Shear. Rigid, strongly braced frame; compounded linkage and extra strength where needed. Many exclusive features. Write for FREE illustrated Bulletin.

See your Beverly Distributor today.
Ask for a demonstration—no obligation.

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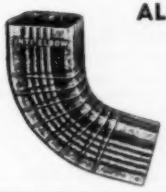
OUR ELBOWS HAVE PERFECT FORM

CONDUCTOR PIPE ELBOWS, SHOES
ALL SIZES • ALL METALS
ALL ANGLES • ALL GAUGES



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BARBER BURNERS

FOR FURNACES, BOILERS AND APPLIANCES

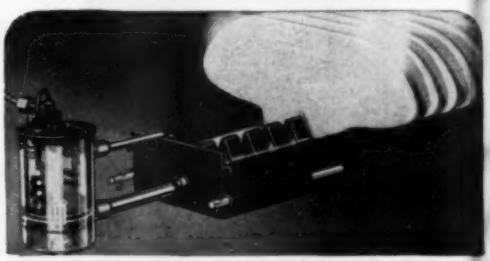
Latest design Barber 324-B round Conversion Burner with improved controls, encased in streamlined hood. Tested and certified by AGA Laboratory under current listing requirements.

Barber Gas Conversion units offer unequalled combustion principles, because of famous Barber air-activated, vacuum pre-mixture Jets, and direct "scrubbing" application of high intensity flame to walls of firebox. Made in sizes, shapes and capacities to suit all round or oblong furnaces or boilers, and to burn any kind of gas. Equipped with the finest automatic controls. No other burner burns like a Barber. For lasting efficiency, use Barber, the leader for over 30 years.

Send for latest Catalog on conversion burners, all types of appliance burners, and controls.

THE BARBER GAS BURNER CO.

3708 SUPERIOR AVENUE **CLEVELAND 14, OHIO**



The COMPLETE Humidifier Line for Warm Air, Air Conditioning, or Steam

FLOTROL Humidifiers — the finest for air conditioning or forced air, with famous Flotrol control.

No. "310" FLOTROL — for small furnaces (up to 100,000 BTU). Economical, easy to install, has Flotrol control.

MICRO-FEED Humidifiers — low cost, dependable drip-feed unit.

HUMIDITY CONDITIONER — self-contained gas-fired unit, ideal for radiator heating systems.

Full details and prices on request.

THE CLEVELAND HUMIDIFIER CO.

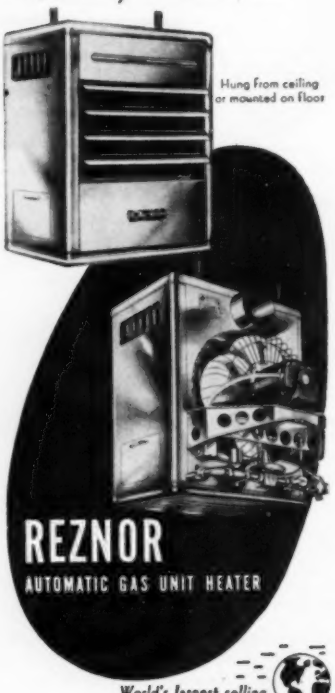
7802 Wade Park Avenue **Cleveland 3, Ohio**

MONMOUTH HUMIDIFIERS

1 heater or 100

Reznor Dealers are backed with about 116 million ad impressions annually. A top name and quality product with models for the small single room and capacity (with multiple installations) for the largest. Homes, offices, stores and factories are users. Potential of the market unlimited. Write for proposition.

Easily, Quickly Installed



World's largest selling gas unit heater

METAL SERVICE COMPANY
GREEN BAY, WISCONSIN
Send me 20-page catalog in full color

Name_____
Firm_____
Address_____
City_____ Zone____ State_____

Kruckman —

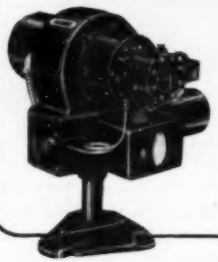
Republican senators filed bills to give him what he wanted. They told newspaper men their action was intended to deprive him of political advantages. But they failed to advise their colleagues, the Republican senators, who are members of the senate banking and currency committee. These senators knew nothing about what their Republican colleagues had done until they heard about it over the radio and read it in the newspapers. This did not encourage friendly sentiment.

When this information reached Senator Maybank, chairman of the committee, a Democrat and a high grade man, he was very much irritated. He said quite frankly it seemed to him very shoddy politics. He believed in the Capehart and Herlong amendments. But further consideration led him to feel that perhaps changes should be made in the new Defense Production Act. Reflection led him to ask Defense Mobilizer Wilson to give him a substitute. Wilson, of course, passed the request along to the White House, the OPS, the DPA and NPA. The resulting substitute seems to have made very little difference, at least in the superficial aspect of the act; however, in effect it stripped the Capehart and Herlong amendments, of their mandatory character, and gave OPS almost complete discretion in applying the interpretation of the law. If the substitute is enacted, it is more perfect so far as government agencies are concerned, but deprives business of all the advantages gained in the two amendments. It has been pointed out it makes much easier the operational techniques of OPS, but increases the difficulties of those upon whom the techniques are exercized. Someone told one of the subcommittees that there is no need to make special laws to make the operation of OPS smoother; what is needed are laws to make the use of the law smoother for business.

Little Interest

Both Senate and House, at first, were startled to find that business and industry apparently were completely uninterested in what might happen to the Capehart and Herlong amendments. With a background of the politics involved, senators and representatives came to the conclusion, under the apparent circumstances of indifference reflected in the attitude of those most affected, they would slide the new substitute through and the substitute would be enacted as swiftly as possible. Apparently business people had paid little attention to the substitute because it had been widely reported there was only the most remote chance that it would be made into law. It was repeatedly asserted that neither the Senate nor the House wished to spend time on the President's revision. However, when it became known, through messages sent broadcast by representatives of trade associations, that there was considerable likelihood Truman would get a new version, the picture changed. Where two interests only had asked for an opportunity to appear in opposition, suddenly a number of requests came tumbling in for a place on the program in opposition. At this writ-

ANCHOR Oil Burners



Sell Faster

because they're

Made Better!

To cash in on your share of profits to be made from the trend to oil heating line up with Anchor . . . the conversion burner that PROVES itself BETTER on more major points. Economy! Ease of operation! Greater heat output! Freedom from vibration! All these advantages and MORE, are in your favor when you go after business with an Anchor. Write for complete details.

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OIL BURNER
ANCHOR DIVISION
STRATTON & TERSTEGGE CO.
Incorporated
P. O. Box 311, New Albany, Indiana

CORRECT FIT!

YOU CAN GET THE ANGLE RING NEEDED, CORRECTLY MADE TO MEET YOUR SPECIAL REQUIREMENTS.

Uses: Joining pipe or smoke stack sections; Reinforcing rims for tanks, vats, drums or circular guards; Bases for fan and other installations.

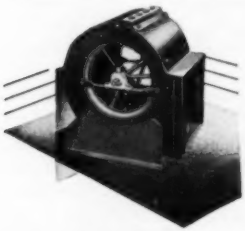
We also produce other rings made of Tees, Channels, Flats, Rounds, Pipe and Tube with the same exacting care.

Write or phone today for our list of Leg Out Stock Size Angle Rings and applicable discounts, also for our circular describing all of our fabricating services.

Phone Bishop 7-4255

NATIONAL METAL FABRICATORS

2138 South Sawyer Avenue Chicago 23, Illinois



MASSACHUSETTS AIR CONDITIONING FURNACE BLOWERS

Designed for manufacturers of warm air furnaces and air conditioning equipment.

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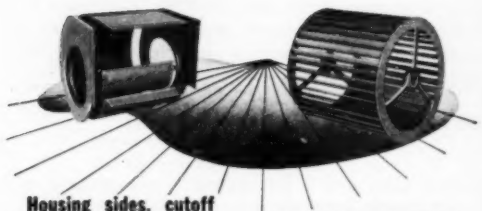

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FOR ATTIC FAN

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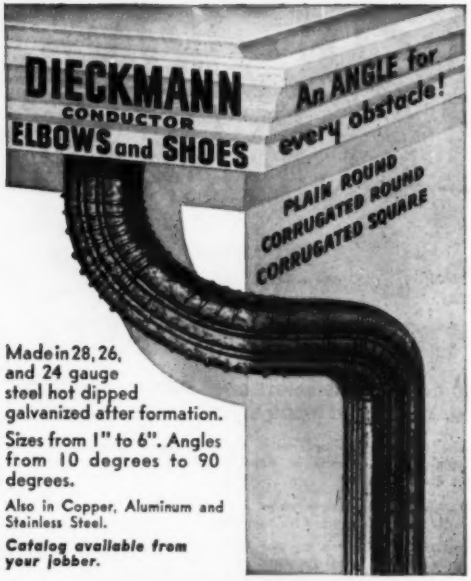

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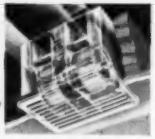
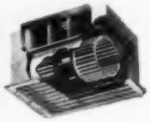


Two centrifugal blowers with motor isolated from greasy air stream. Dripless grille. 2-speed switch. Interchangeable discharge. 425 CFM certified.

MODEL 3501
for Kitchen Cabinet Installation

Two inlets at stove and ceiling level each with washable filters. Two centrifugal blowers delivery 550 CFM certified. 2-speed switch. Hood optional.

MODEL 1501
for Average Kitchens, Laundries, Dens



This is the sensational new double centrifugal blower model. Interchangeable discharge. 300 CFM certified. Motor entirely outside air stream. Dripless grille. 2-speed switch available.

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ing it does not seem likely that the substitute demanded by Truman, as supplied to the Congress by Wilson, will be enacted. However, it is not safe to depend upon the certain action of Congress.

Wilson continues to spread scare stories about increasing scarcities of steel, copper and aluminum. The steel people flatly deny that his statements are true. Scarcity of copper appears to be more realistic, and there seems to be agreement that there is very little aluminum for anything outside of defense work. However, NPA and OPS have found that some segments of the industry, using metals, are tired of the wavering administration and have virtually defied the agencies to do something. It is reported several industrial groups have made their own laws and are using metals as they think they should be used under the existing circumstances. In one instance NPA is reported to have stopped short in shocked bewilderment, and then to have covered the situation by a regulation or an interpretation. Obviously, however, it cannot indefinitely afford to tolerate violations. Whatever the effect may be upon votes, or upon its functions, it will be compelled to take action to enforce its orders, little as it may wish to do so.

They tell us here building costs will increase at least 5 per cent next year. Housing starts the first eight months of 1951, 758,500 units, exceed any comparable period any year on record. The Federal Reserve Board has been severely criticized in and out of Congress for relaxing regulation X, enabling those who wish to build to start with lesser first payments and much longer maturity for the loan. PAD, whose recent order attempts to regulate natural gas service, has been told by Maryland, New Hampshire, Ohio, Virginia, West Virginia, Wisconsin, Idaho and Tennessee that they will handle their own details of regulation in the event of a service shortage. PAD will return all applications for exemption from the order, which have been filed by individual gas companies. The utilities have been told to file with their own state commissions for relief. PAD has let it be known, in case of an area shortage, it reserves the authority to allocate natural gas, if necessary, even in states where commissions are regulating local distribution.

Davidson —

(*From page* 43)

natural lighting and the continuous exhausting of air from the room made it a difficult area to heat.

However, Mr. Hite reported, the new heating system has solved this problem and temperatures are now properly controlled in this room. To prevent dust movement in the spray painting department, the warm air duct has been fitted with long louvered extensions. These are adjusted to minimize air turbulence.

In operation, the heater takes its air supply through louvered openings in the base. Return air from the first floor rises through the elevator shaft and the stairway. This return air is passed over banks of tubes that

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Throat Depths: 18" and 24"

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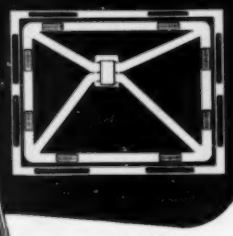

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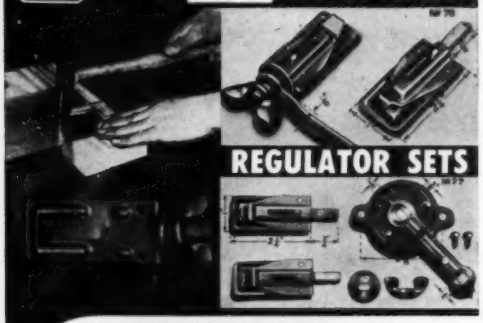
H&C Kwik-way DAMPER



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carry flue gases to the vent stack. Then it sweeps the stainless steel combustion chamber and is discharged back into the heated areas. About 22,000 cfm are handled by the heater. The heater fans are powered by a 20 hp electric motor.

Control of the heater is fully automatic by means of a thermostat. A time clock arrangement eliminates any need for day-to-day attention, such as was necessary when the boiler was in use and had to be stoked in the morning and banked at night.

This type of heating system has proved to be a practical and economical solution to the problem of maintaining uniform temperatures for the body repair and painting shop.

Morse —

(*From page* 55)

The selection of each supply register and the determination of duct sizes are necessary to complete the design of the supply system. It is assumed that these topics offer no problem to the reader so discussion of them is omitted.

* * * * * *

Step 7 Determine the quantity of supply air after it has cooled to 65 F.

Supply air enters each room at the register temperature given in column 4 of Table 3, and in cooling to 65 F it releases the heat

Midco Register Corp.
1059 Grand Ave.
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GET IT FROM YOUR JOBBER
TRADE MARK

Registers — Grilles — Floor Faces — Floor Registers — Gravity Registers. The complete quality line for all winter and summer air conditioning.

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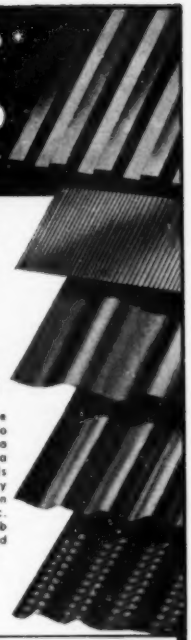

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* Reg. T.M.

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- 50,000 BTU output—Forced draft
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loss of column 1. But, when the air cools from discharge temperature to 65 F it no longer occupies the same volume. The following relation will facilitate the required calculation:

$$\text{Col 7} = \frac{\text{Col 6} \times 525}{\text{Col 4} + 460}$$

For the kitchen,

$$\text{Cfm} = \frac{225 \times 525}{(120 + 460)} = 204 \text{ cfm}$$

Step 8 Determine the lineal feet of crack in each room.

The crack length for each type of opening is given in Table 2; the number of openings in each room is taken from the plan, Fig. 1. For the kitchen there are four A windows and two B windows or $(4 \times 13) + (2 \times 18.5) = 89$ ft. The door has a crack length of 20 ft. These data are recorded in column 8 of Table 3. By using the form 89/20 the window crack is kept separate from the door crack.

Step 9 Determine the crack leakage.

Total crack leakage for each room is merely the crack leakage value from Table 1 multiplied by the lineal feet of crack from Step 8.

For the dining room,

$$\text{Crack leakage} = (89 \times 39) + (20 \times 110) = 3471 + 2200 = 5{,}671 \text{ cfh}$$

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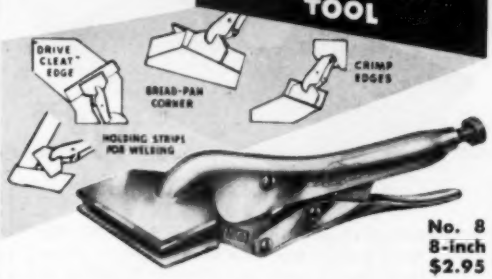

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Pat. applied for

Note that the neoprene is extruded under compression to completely seal the outer edge of the metal washer as well as the fastener shank, through the metal sheets to the nut.

APPLICATIONS: Sheet metal roofing and siding • Auto body and chassis assembly • Sheet metal ductwork • Porcelain-to-metal assemblies.

TOPSEALS are fasteners you specify or supply—nail, bolt, sheet metal screw, etc.—assembled in our factory with Weatherseal Washers, ready for use. Reduce your inventory items with TOPSEAL! Write for sample and prices, stating your fastening or sealing problem. Proven production performance and large stocks maintained for quick shipment assures you of meeting your own production schedules.

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In the exfiltration method there are no arguments about using half the crack in some rooms and all the crack in others — *all* the crack is *always* used in *all* the rooms.

Step 10 Change the crack leakage from cfh to cfm.

This is done by merely dividing column 9 by 60. Record in column 10.

Step 11 Determine the amount of air to be returned from each room.

Return air = Cfm (@ 65 F — crack leakage

Col 11 = Col 7 — Col 10

For the living room,

Return air = 193 — 85

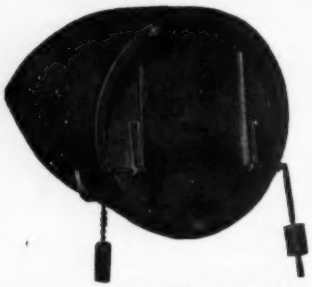
= *108 cfm*

Step 12 Accurately size the return grilles and ducts for the quantities of air calculated in Step 11.

Roberts —

(*From page* 62)

The dealer should keep his working capital from becoming excessive by investing in forms of business improvement. However, he should not modernize or expand beyond his capacity to keep the business liquid at all times after betterment. Suppose a dealer's working capital is $5,000 before he invests in betterment as shown in the foregoing table, current assets, $10,000, current debt, $5,000, giving $5,000 working capital.



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The current debt or liabilities would cover the bills payable, loans payable, and accrued liabilities, monies due to the date of the financial statement but not usually recorded, such as mortgage interest, payroll, taxes, etc. If $5,000 working capital is needed to keep a business liquid, the dealer must increase this dollar figure if he expands his facilities, he cannot expect the same working capital to carry a bigger load and retain the same degree of liquidity. For this reason, the dealer intent on betterment should give consideration to the probable increase he can expect in seed money or estimate beforehand what he may need. After investing $10,000 in improvements the dealer with the foregoing balance sheet may find his finances in this condition.

TABLE 10

Current assets	$10,000	Current liabilities .	$ 5,000
Fixed assets	20,000	Fixed liabilities ..	10,000
		Net worth	15,000
Total	$30,000	Total	$30,000

This dealer's fixed assets are now $20,000 instead of $10,000. His net worth and working capital have not increased. Yet, the additional investment in fixed assets means more outlay for upkeep and promotion, which more than likely will be too much for the same working capital to carry. As a result this dealer will not be able to meet his obligations on time and may get into financial trouble.

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Flue Thimble
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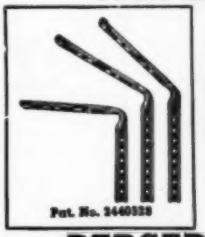
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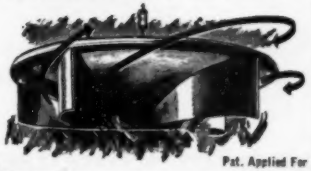
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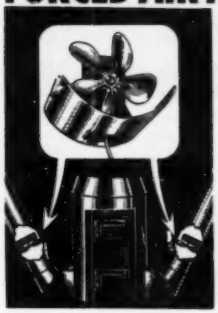
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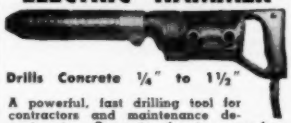

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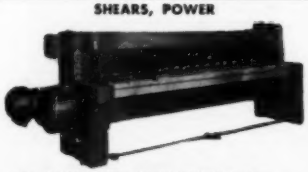

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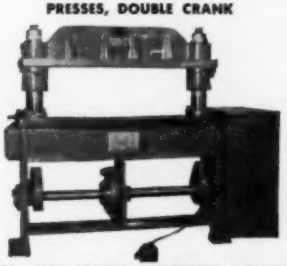

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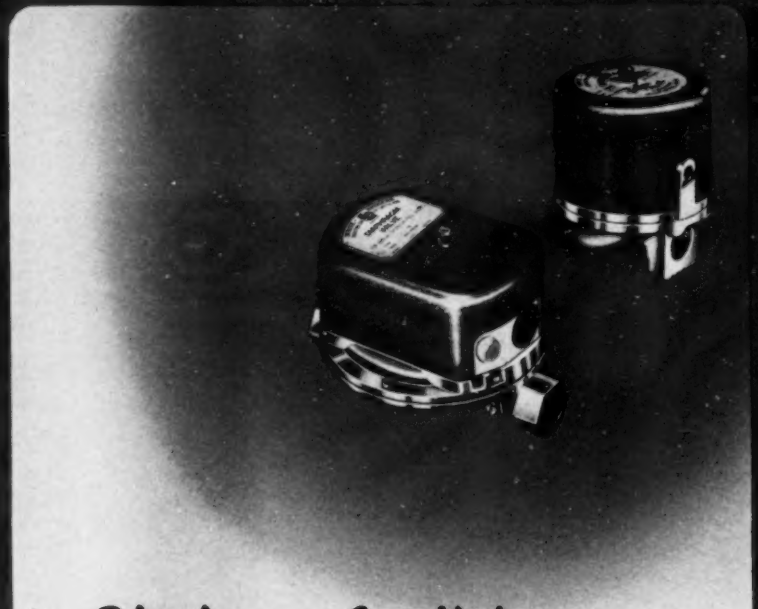

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WHITE-RODGERS

WR *Controls*

FOR REFRIGERATION HEATING AND AIR CONDITIONING